

【書類名】

図 面

【図 1】

本 発 明 の 原 理 構 成 図

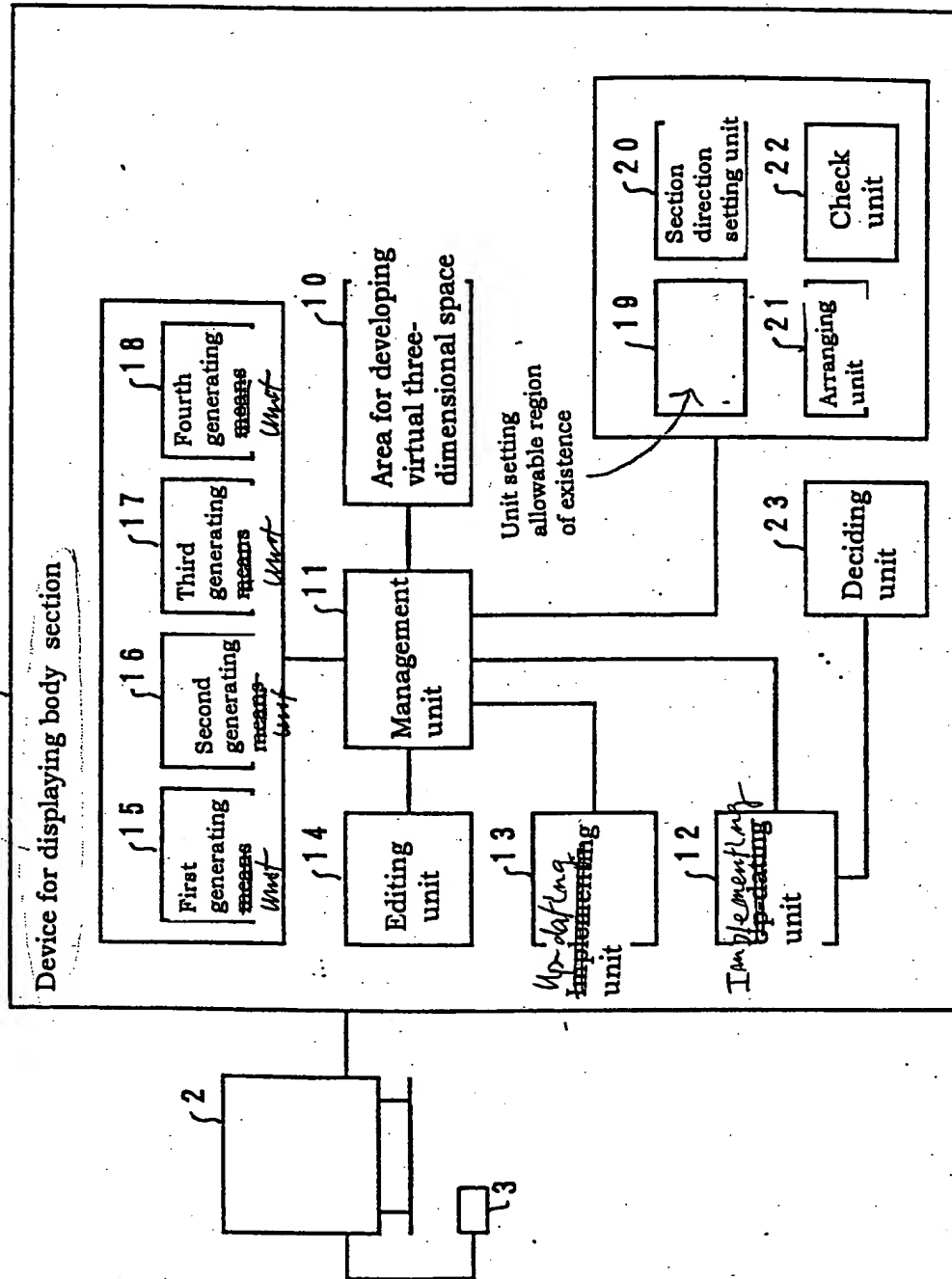


FIGURE 1

【図2】

本発明の一実施例

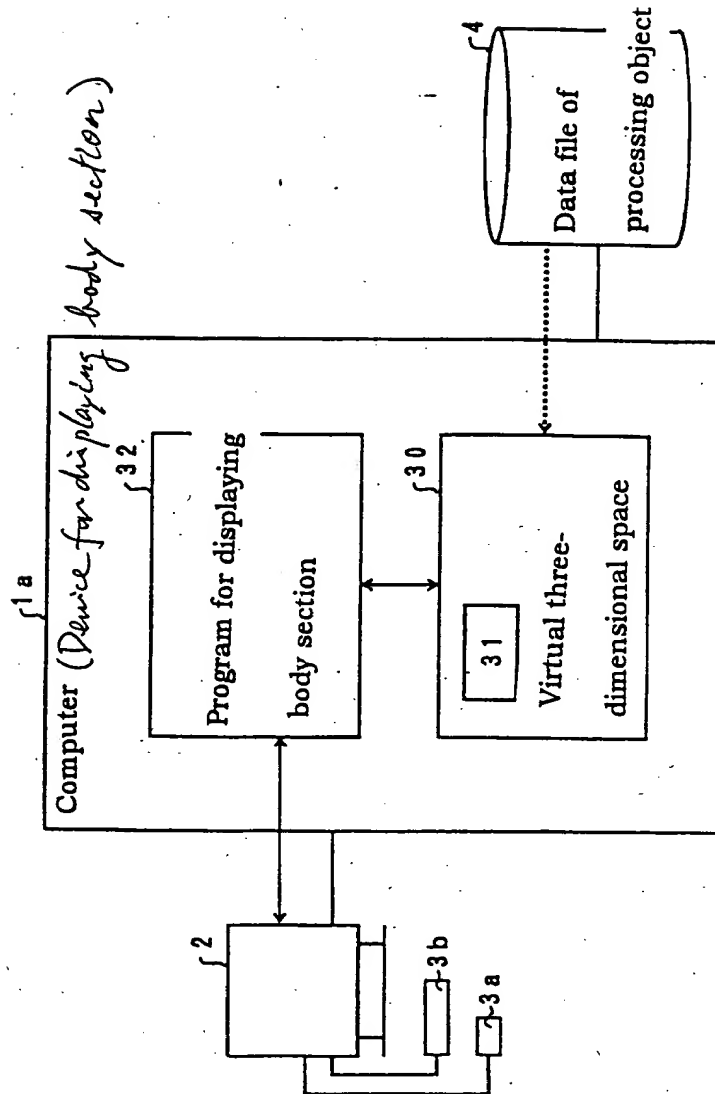
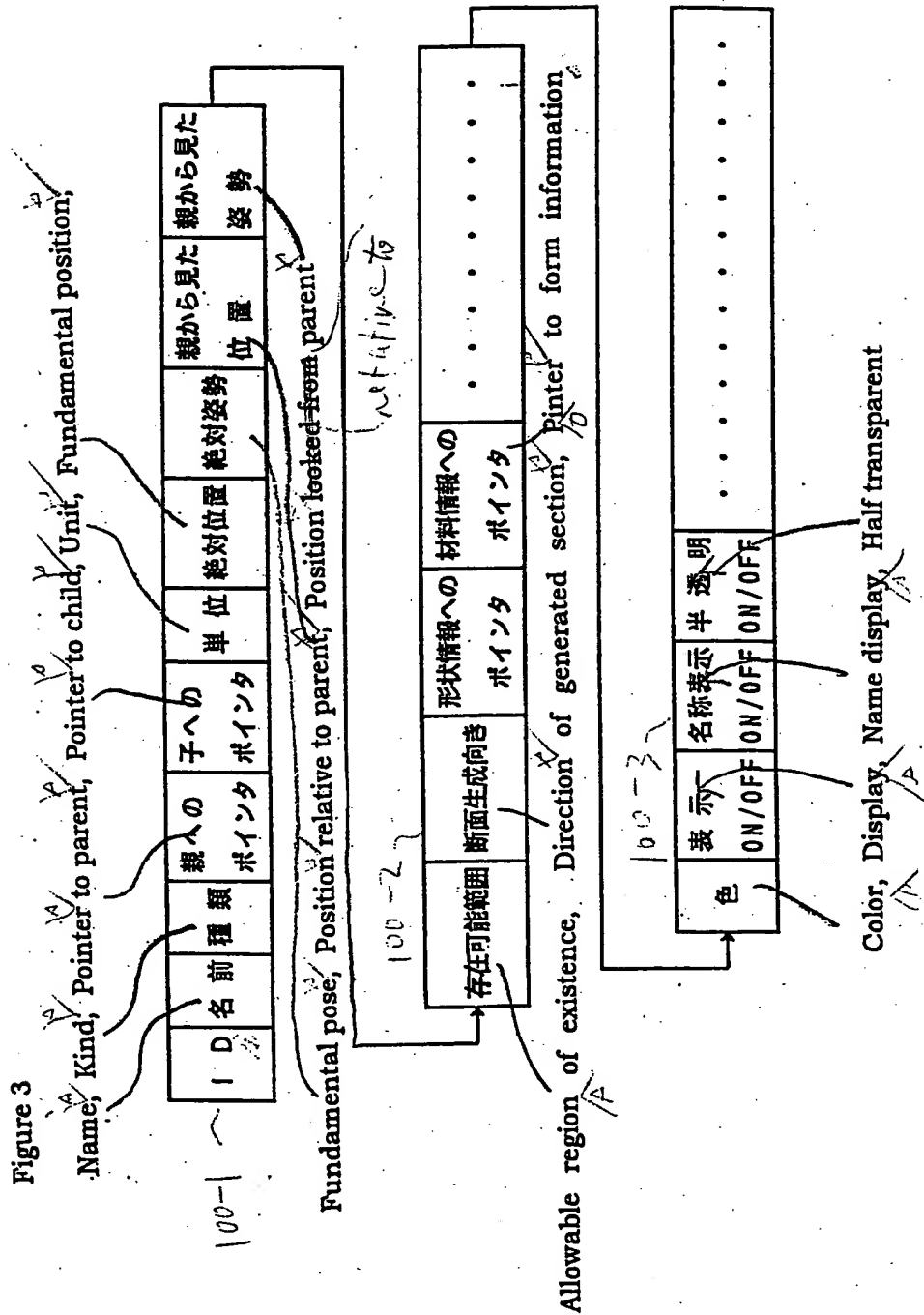


FIGURE 2

【図3】

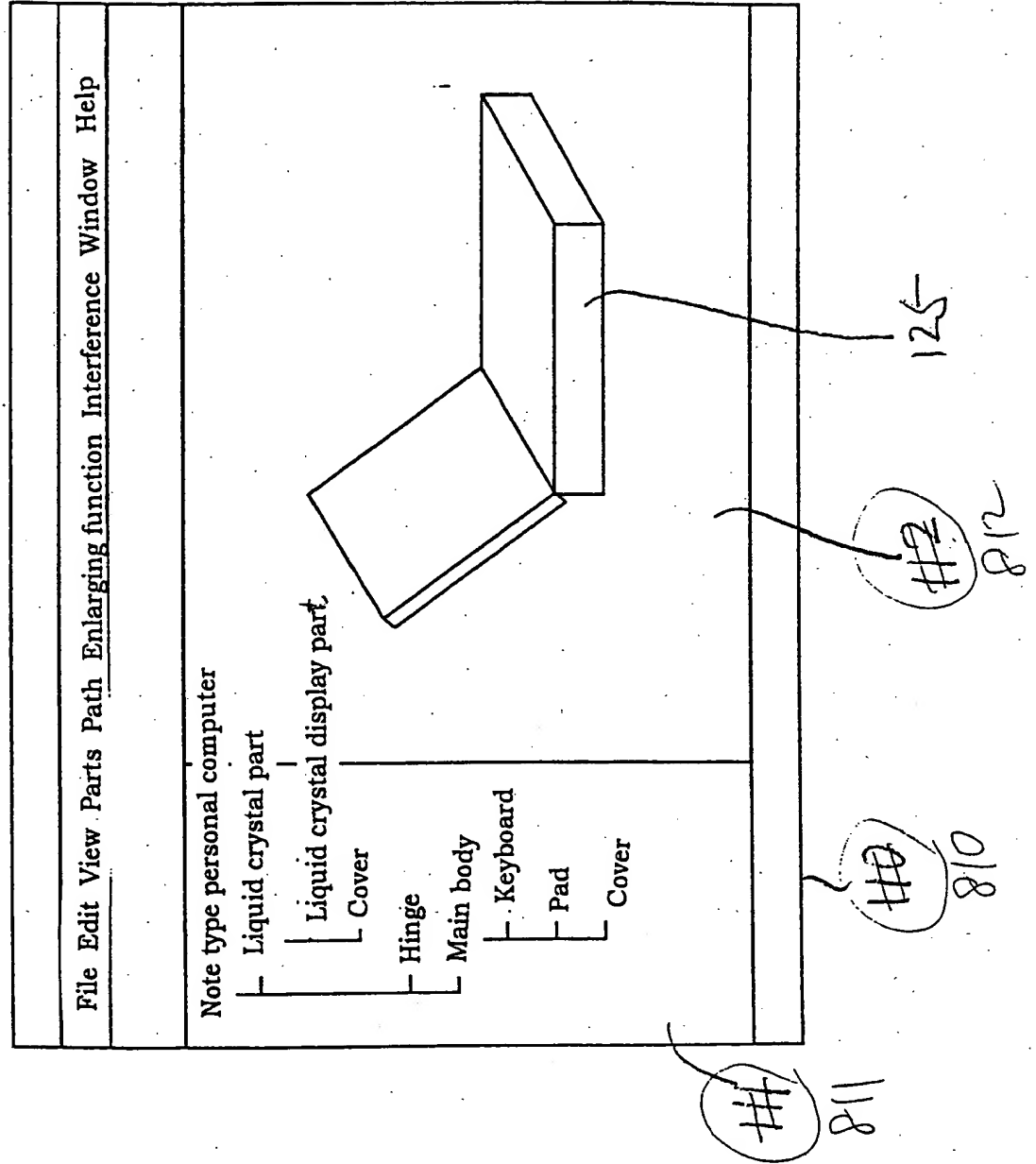
空間構造管理テーブルの説明図



【図4】

物体断面表示プログラムの処理説明図

FIGURE 4



【図5】

物体断面表示プログラムの処理フロー

Figure 5A

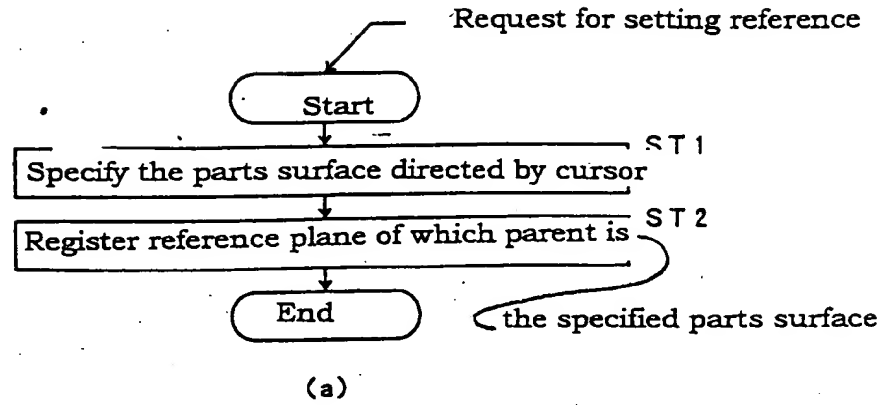
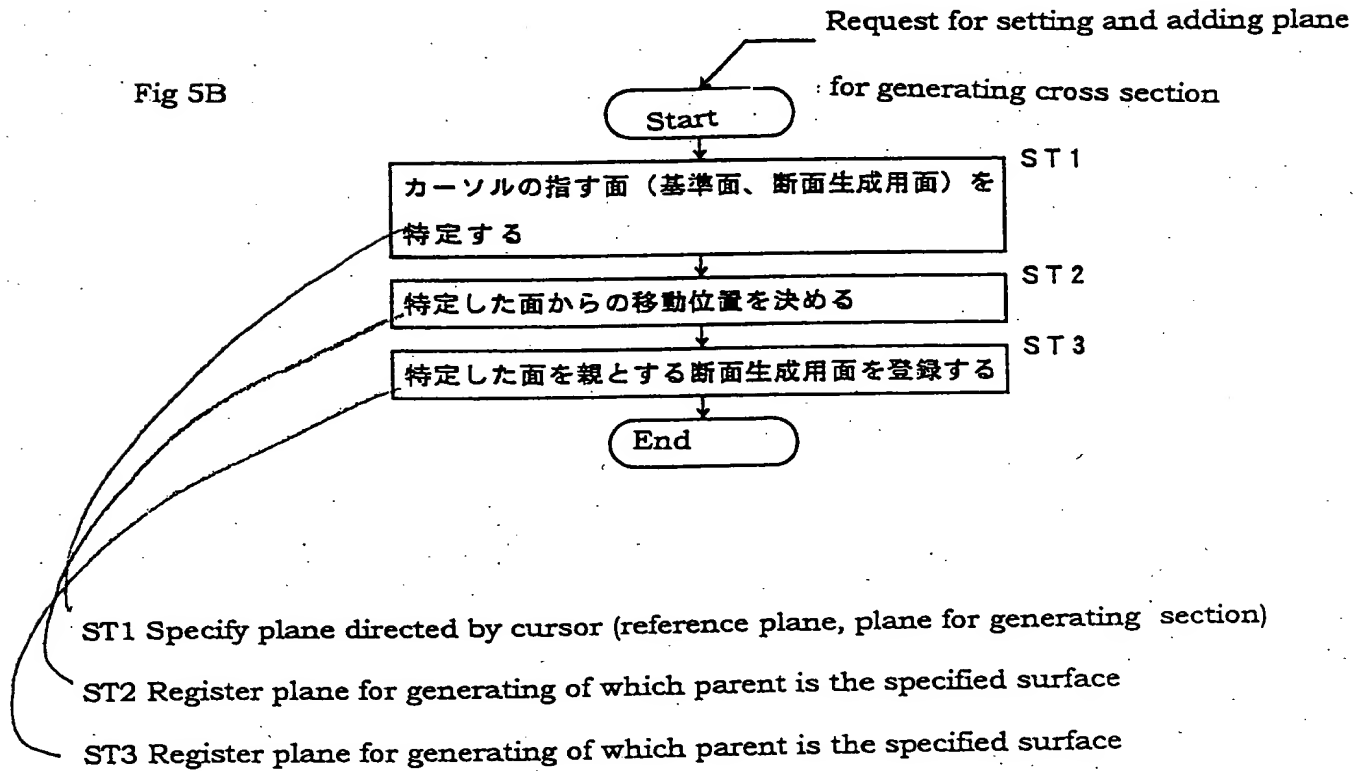
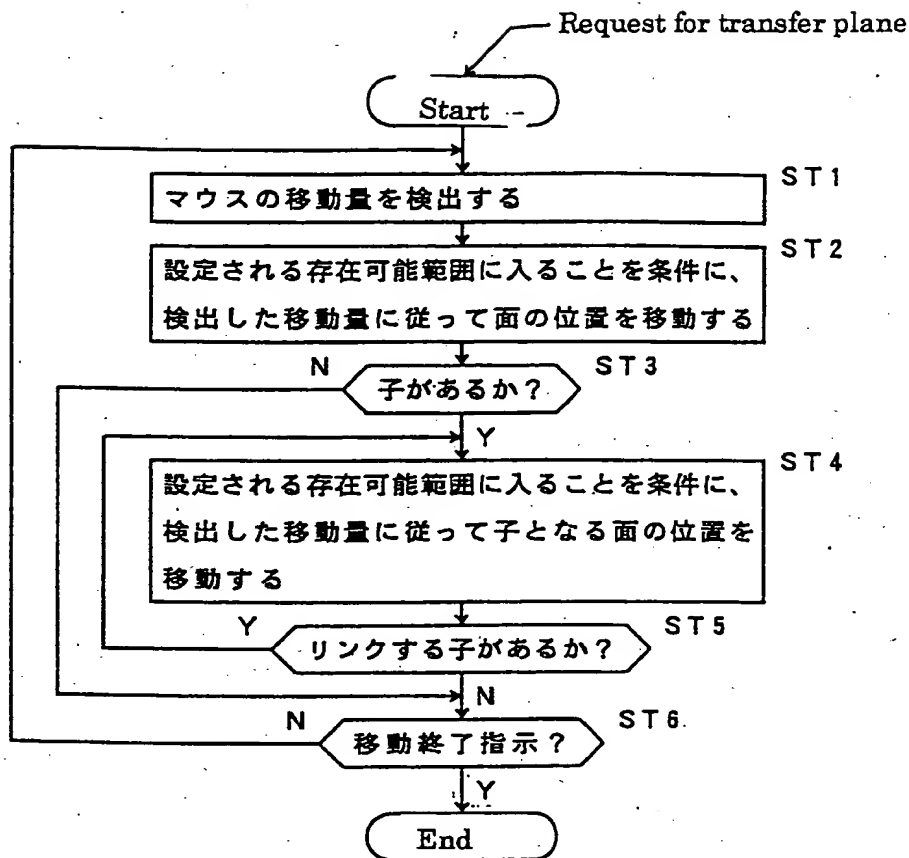


Fig 5B



【図6】

物体断面表示プログラ Figure 6



ST1 Determine movement value of mouse

ST2 Move plane according to the determined moving value, under condition being within the set allowance region of existence

ST3 Is there child?

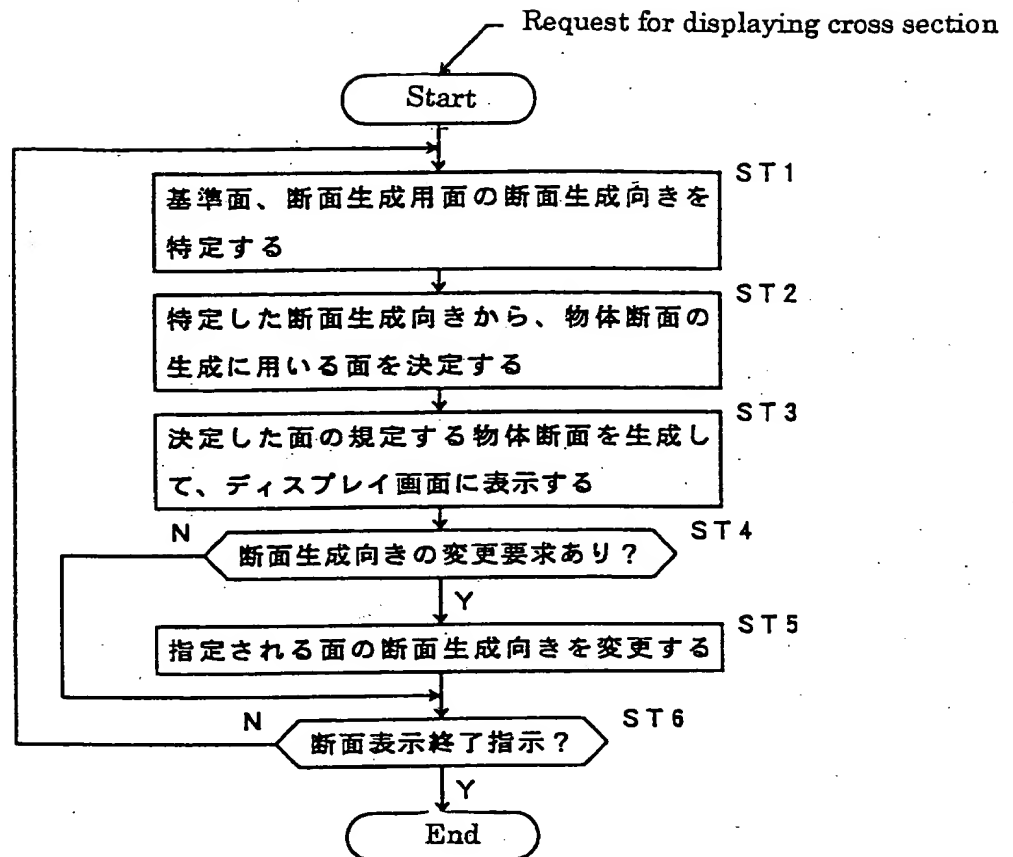
ST4 Move the child plane according to the moving value, under condition being within the set allowance region of existence

ST5 Is there link of child?

ST6 Direction for ending movement

【図 7】

Figure 7



ST1 Specify direction for generating cross section of reference plane, plane for generating cross section

ST2 Determine plane for generating body cross section by the specified direction for generating cross section

ST3 Generate body cross section ruled by the specified plane, and display it

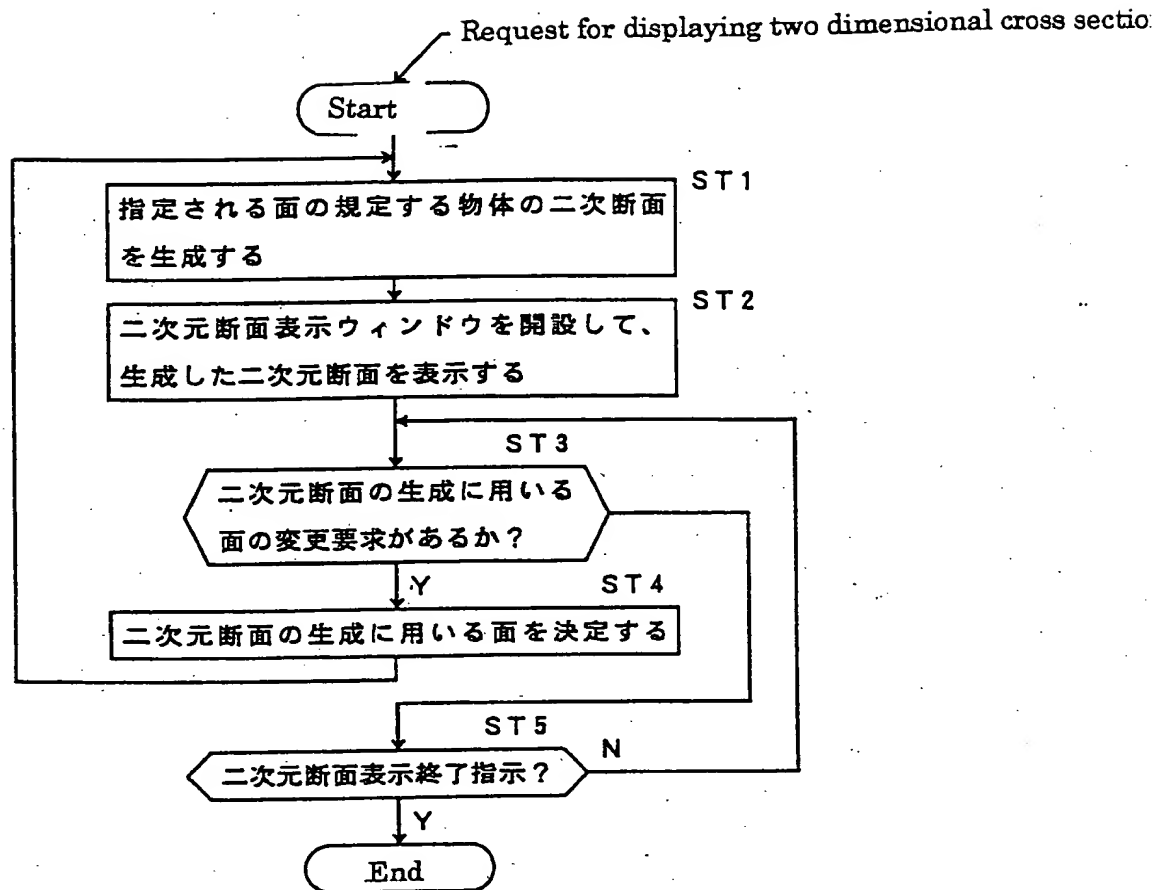
ST4 Is there request for change of direction for generating cross section

ST5 Change direction for generating cross section of specified plane

ST6 Request for ending display of cross section

【図 8】

Figure 8



ST1 Generate two dimensional cross section of body ruled by the directed plane

ST2 Open window for displaying two dimensional cross section

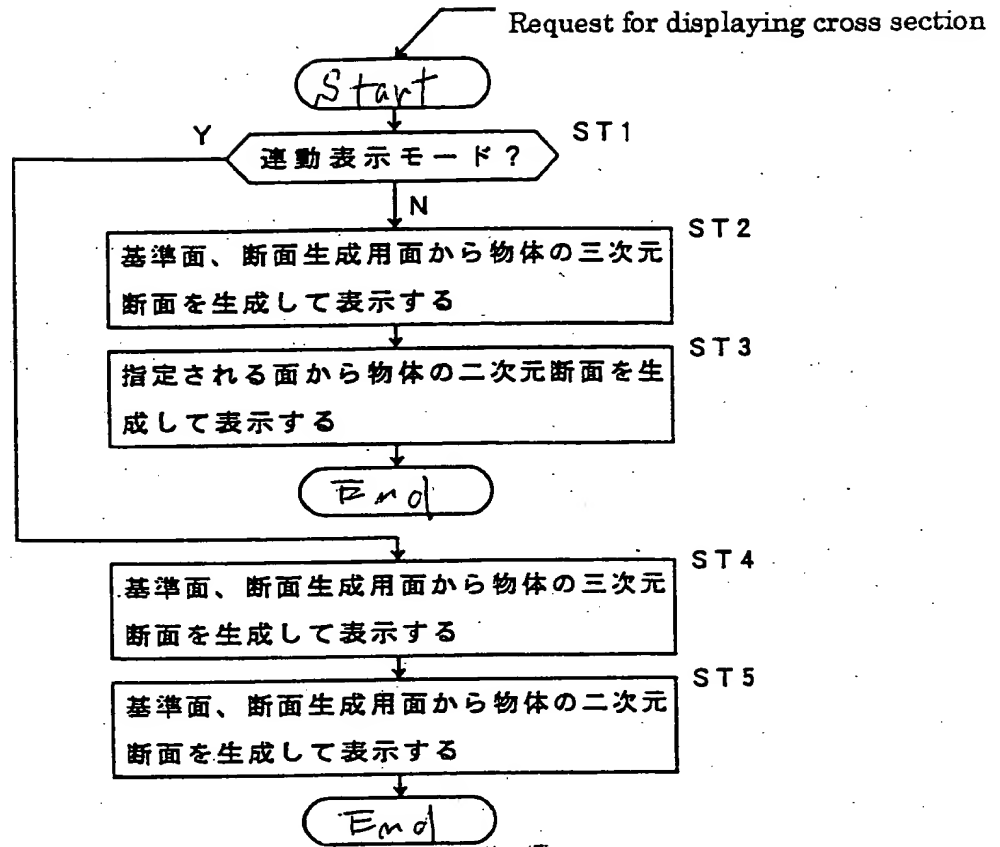
ST3 Is there request for change of plane for generating two dimensional cross section?

ST4 Determine the plane for generating two dimensional cross section

ST5 Request for ending two dimensional cross section?

【図 9】

Figure 9



ST1 Linking display mode ?

ST2 Generate three dimensional cross section of body by reference plane, plane for generating cross section

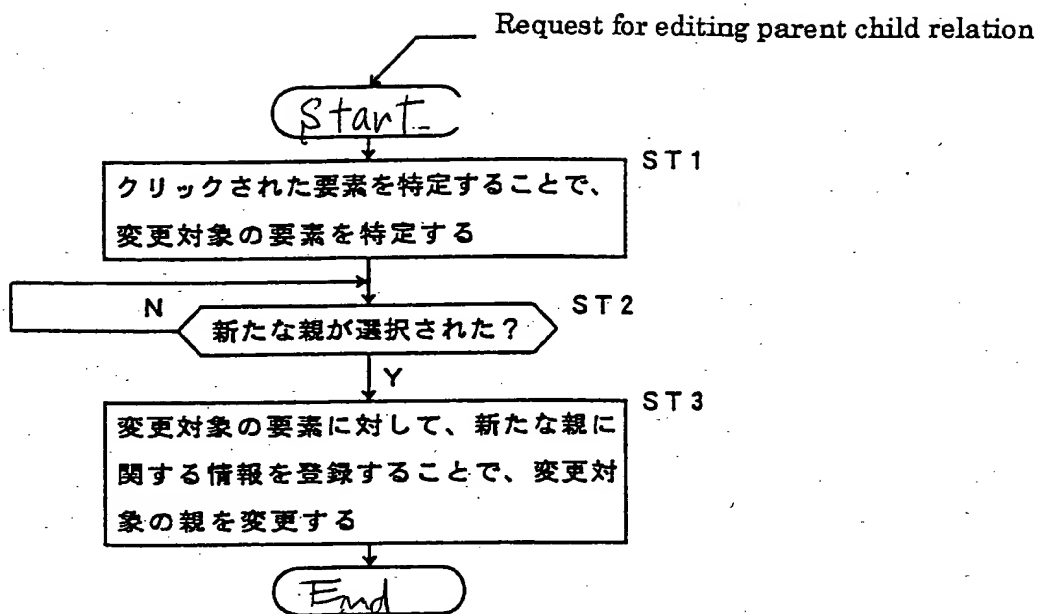
ST3 Generate two dimensional cross section of body by the directed plane

ST4 Generate three dimensional cross section of body by reference plane, plane for generating cross section

ST5 Generate two dimensional cross section of body by reference plane, plane for generating cross section

【図10】

Figure 10



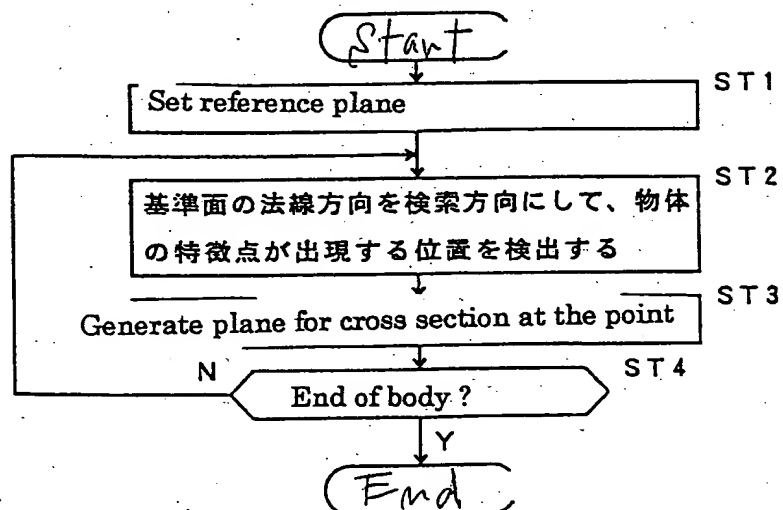
ST1 Specify clicked element, and specify element of change object

ST2 New parent id selected ?

ST3 Change the parent of change object by registering information concerning to the new parent for the element of change object

【図11】

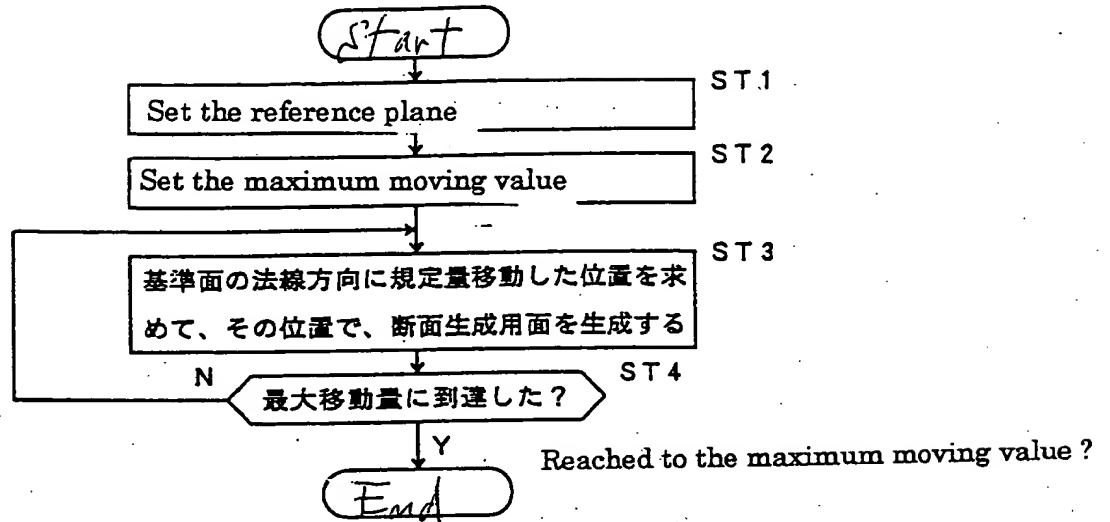
FIGURE 11



ST2 Determine position appearing of specific point by normal direction of reference plane as detecting direction

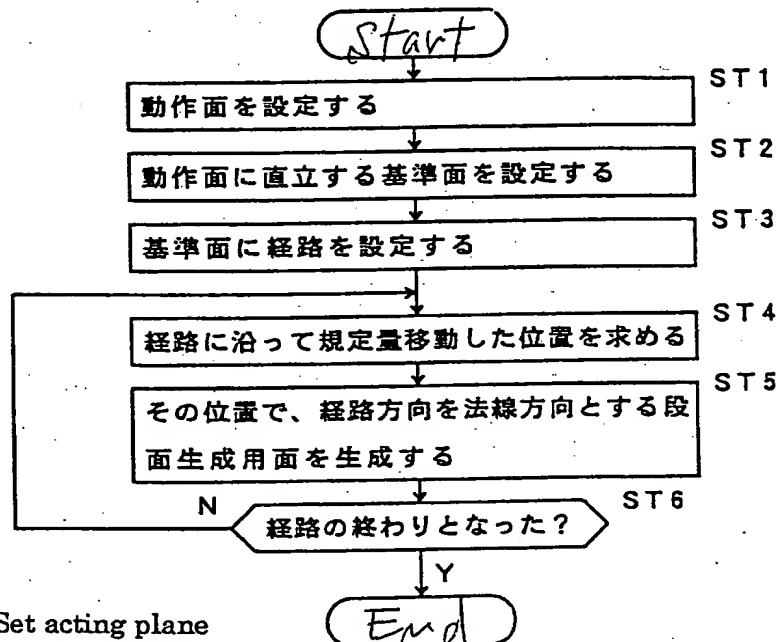
【図12】

FIGURE 12



ST3 Determine a position moved by ruled moving value in direction of normal direction of reference plane

Fig. 13



ST1 Set acting plane

ST2 Set reference plane perpendicular to the acting plane

ST3 Set path on the reference plane

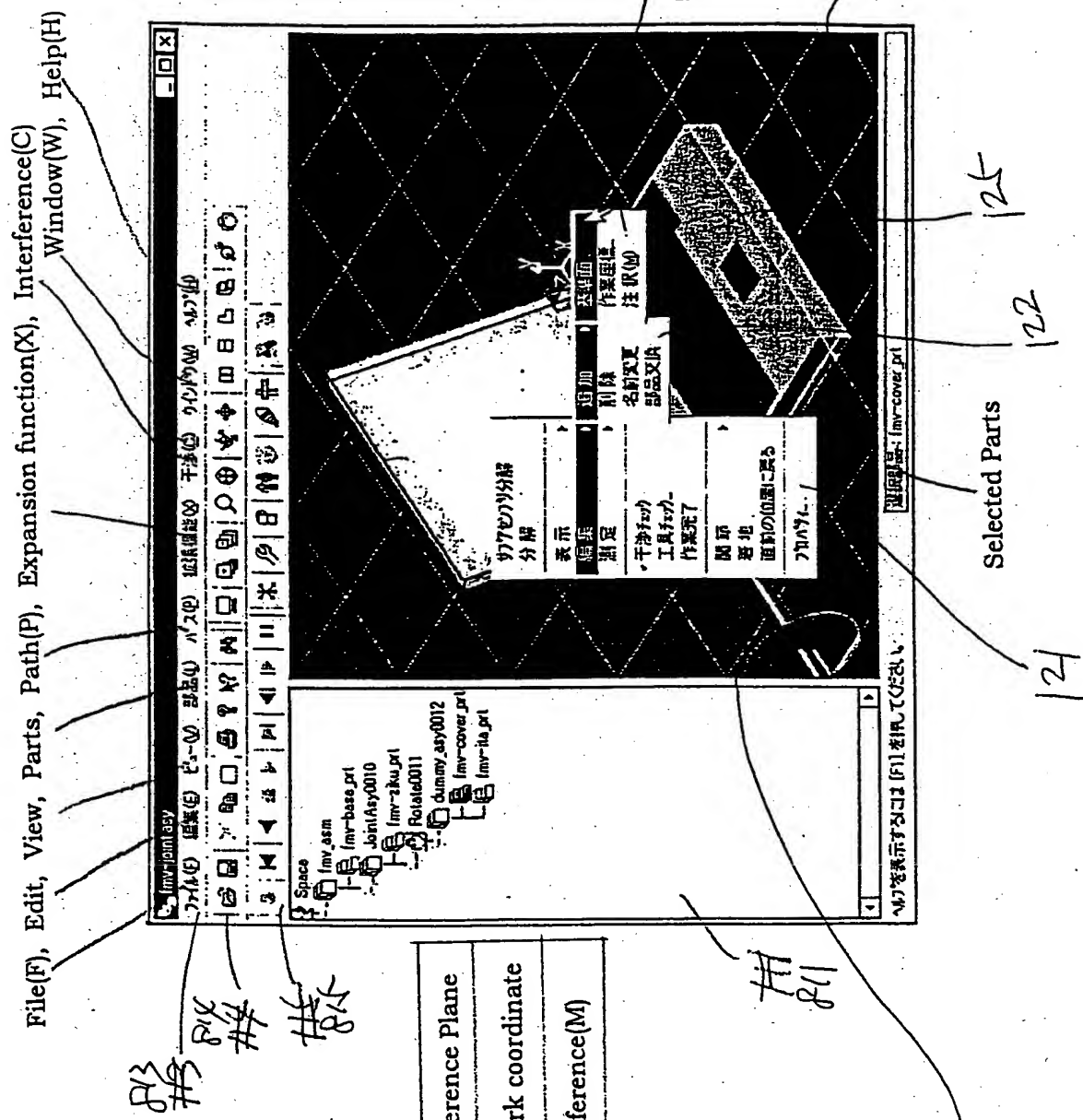
ST4 Determine position moved by ruled value along to the path

ST5 Generate plane for generating cross section of which normal direction is the path direction at the point

ST6 End of path ?

【図14】

ディスプレイ画面の説明図



assembly					
composition					
composition					
display					
lit					
measuring					
interference check					
cool check					
work completed					
point					
anding					
return to just before position					
roperty					

FIGURE 14

【図15】

ディスプレイ画面の説明図

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

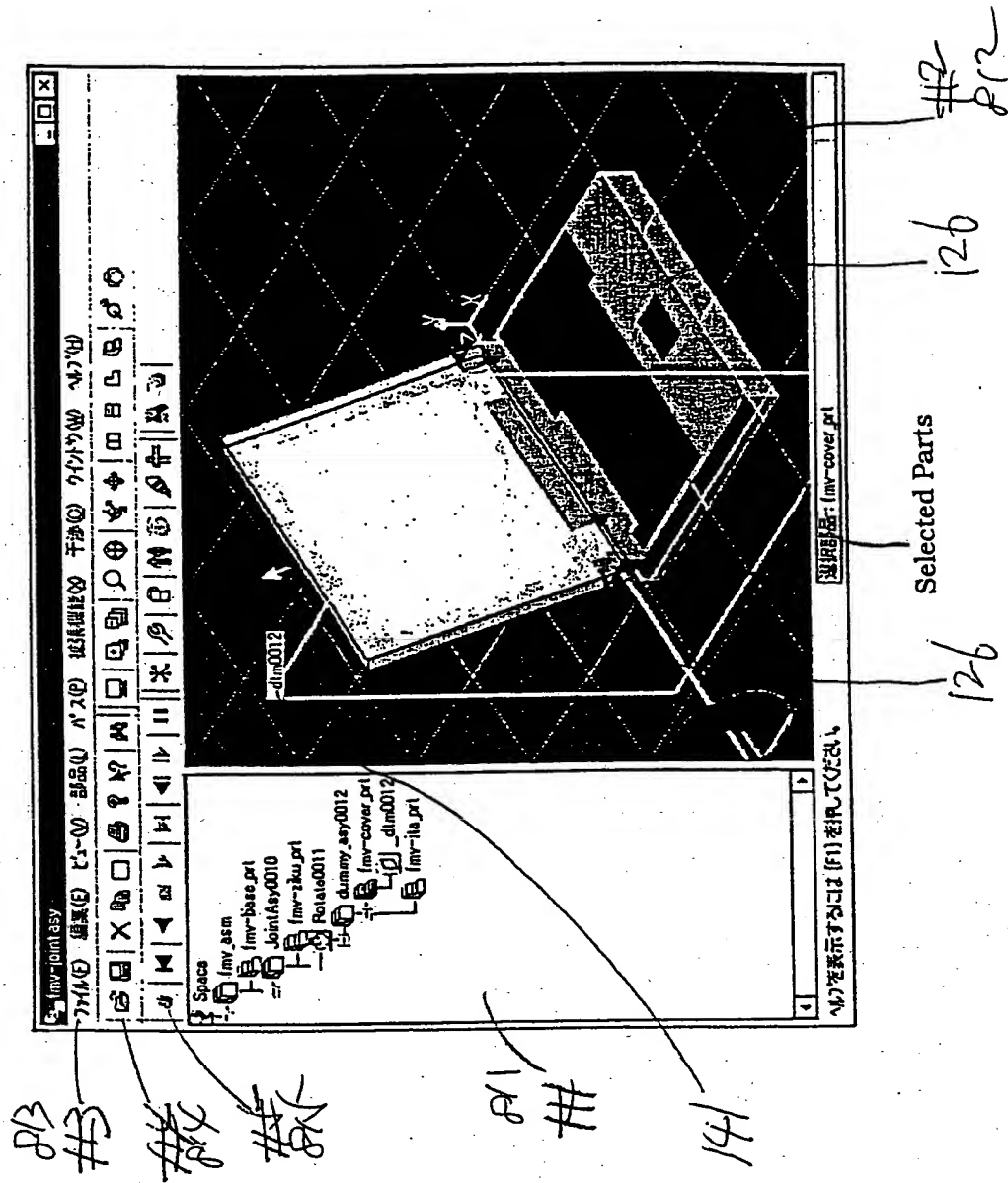
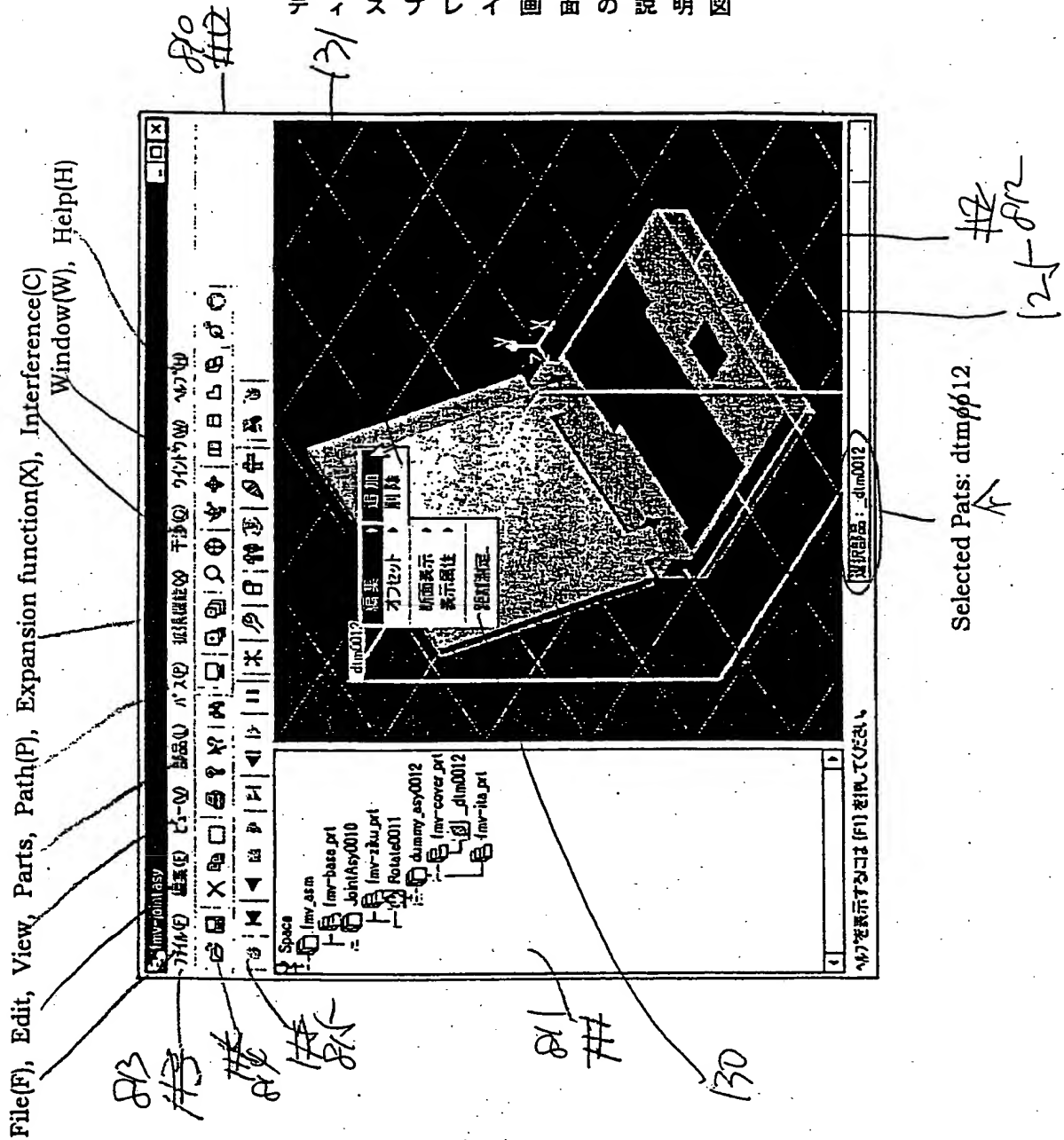


FIGURE 15

【图 16】

ディスプレイ画面の説明図

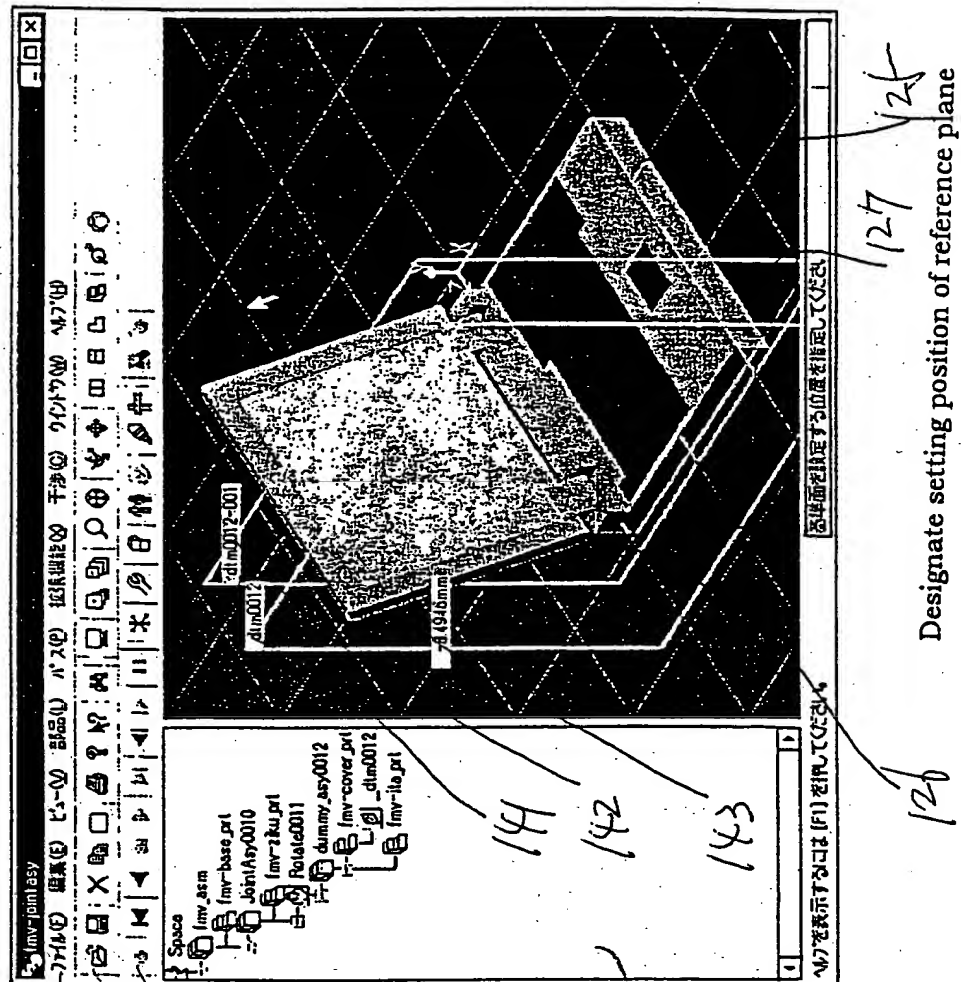


Selected Pats: dtmóó12

FIGURE 16

Edit	Add
Offset	Delete
Displaying Section	
Display Attribute	
Measuring Distance	

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)



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【図18】

ディスプレイ画面の説明図

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

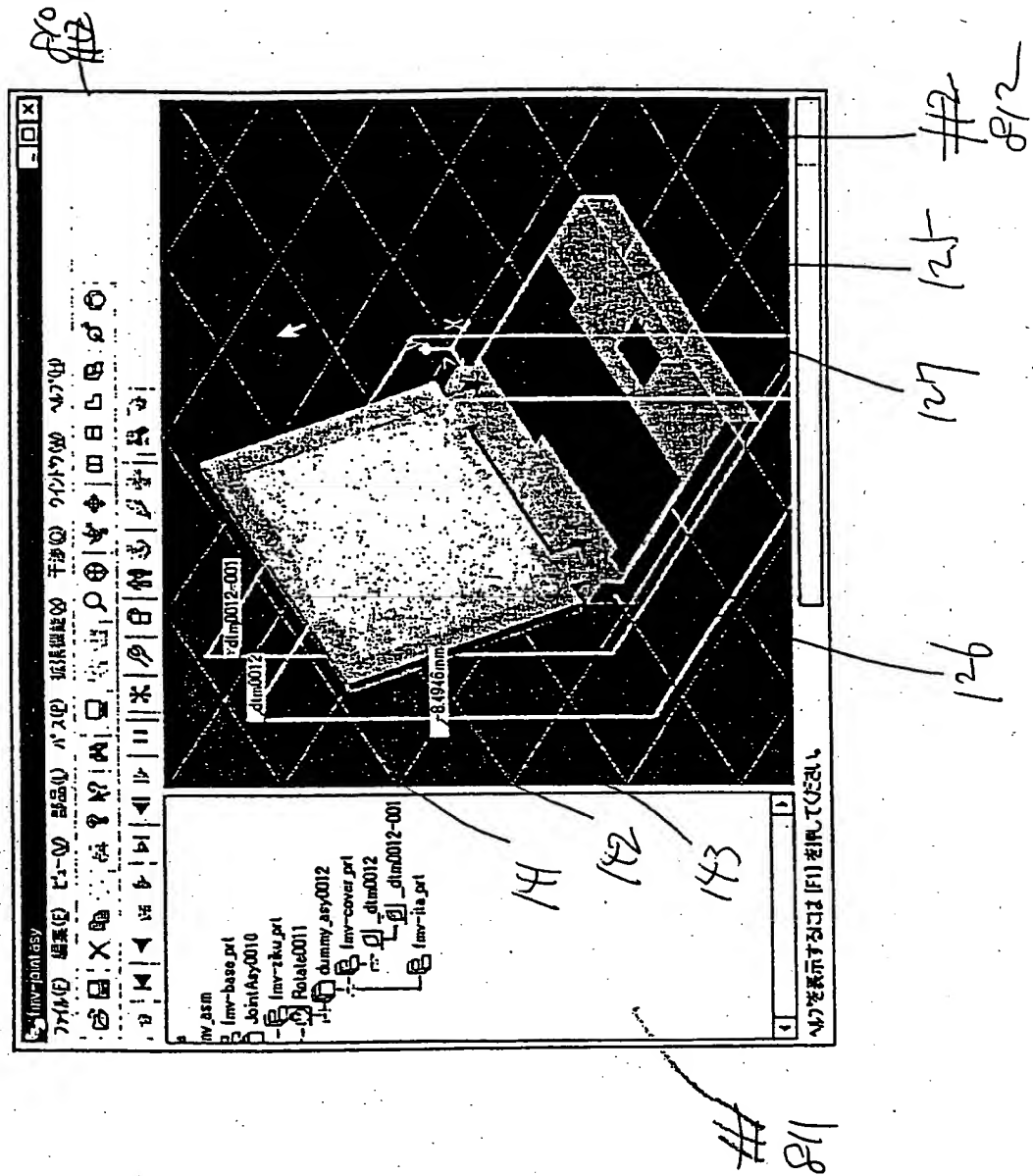
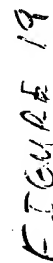


FIGURE 18

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)



【図20】

物体断面表示プログラムの処理説明図

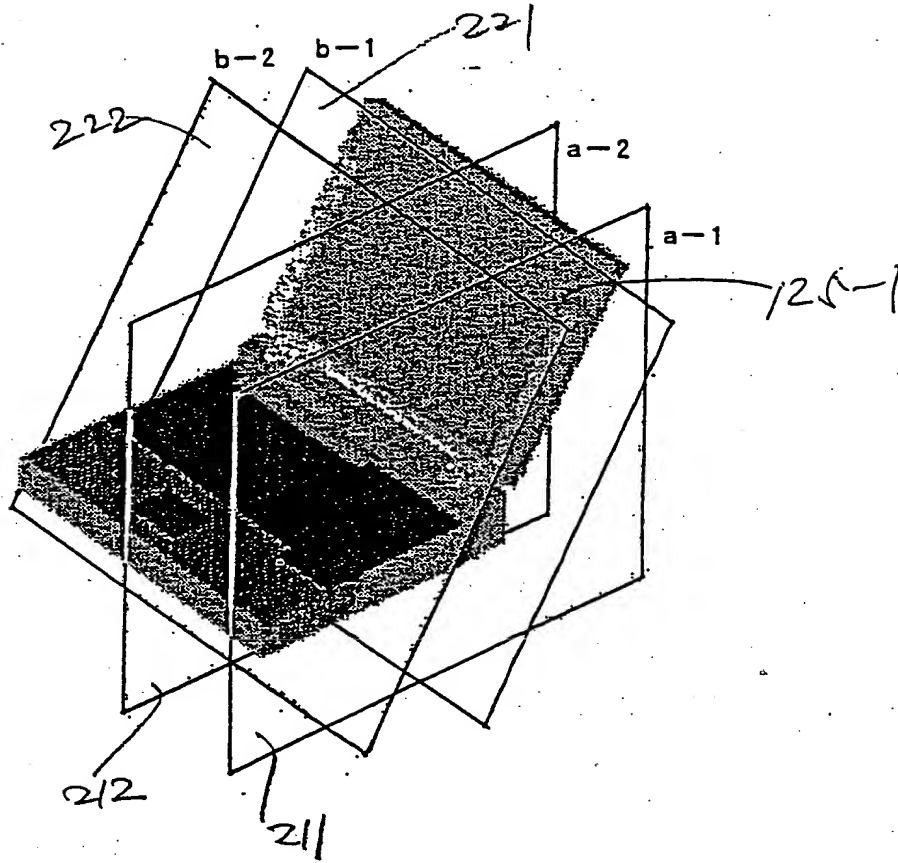
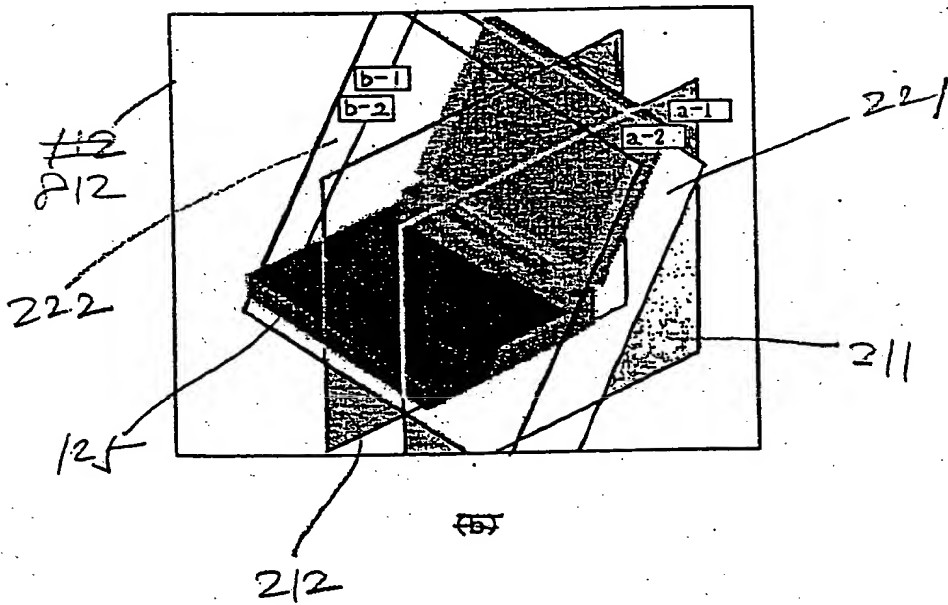
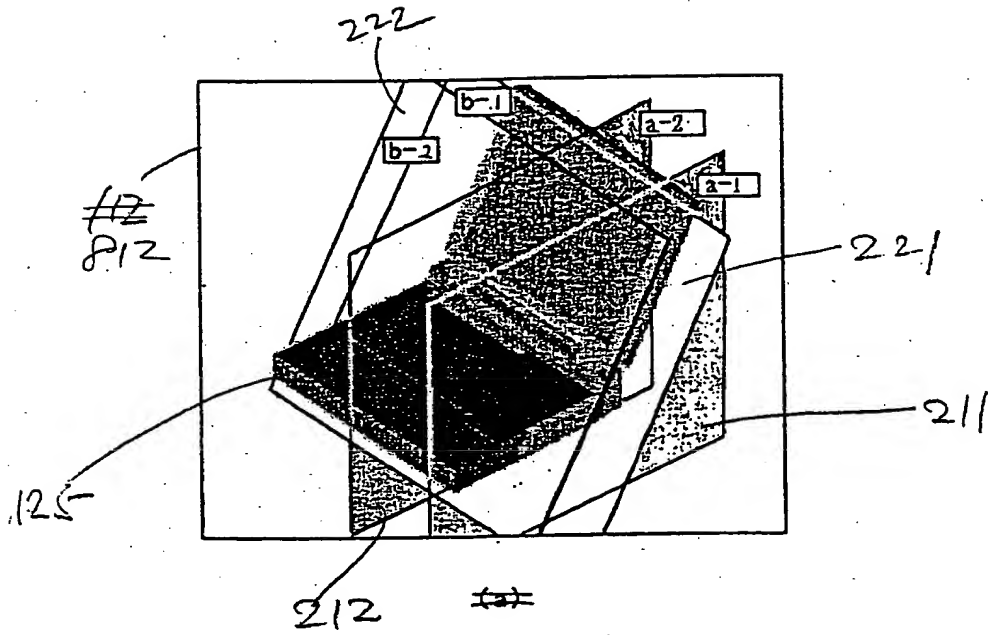


FIGURE 20

【図21】

物体断面表示プログラムの処理説明図



【図22】

物体断面表示プログラムの処理説明図

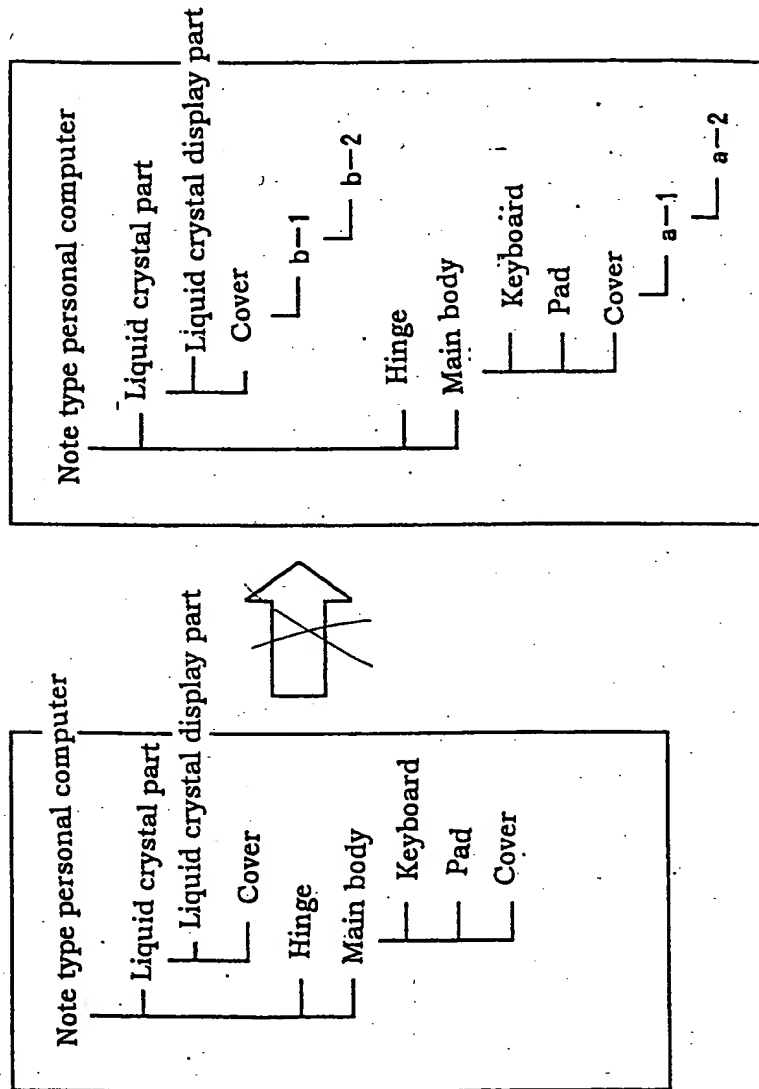


Fig. 22A

Fig. 22B

【図23】

物体断面表示プログラムの処理説明図

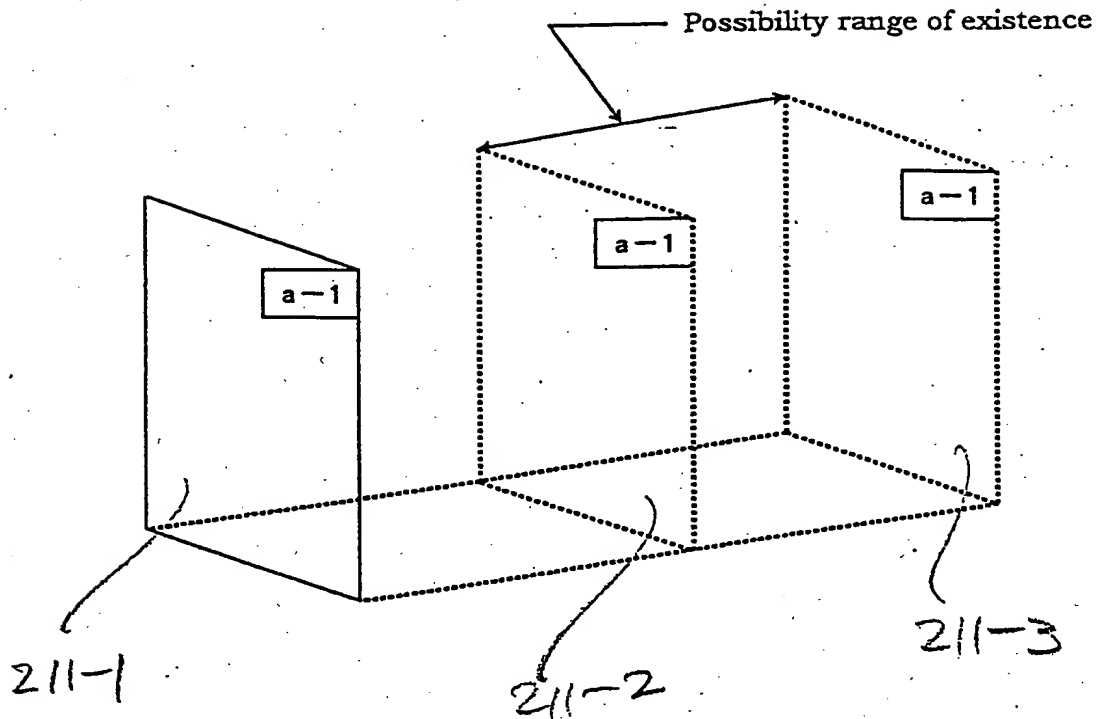
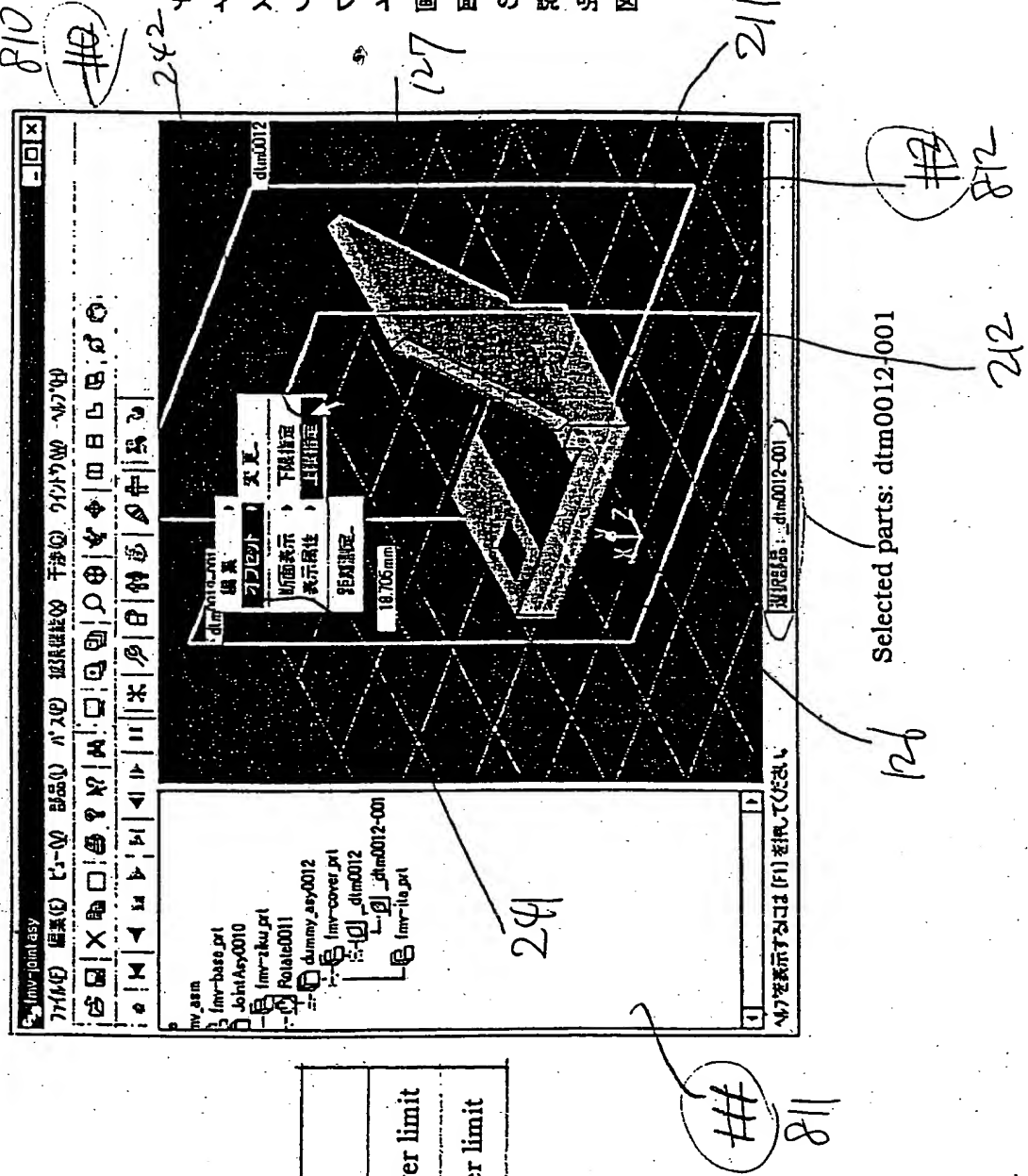


FIGURE 23

【図24】

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

ディスプレイ画面の説明図



Edit	
Off set	Change
Displaying section	Designation of lower limit
Display attribute	Designation of upper limit
Measuring distance	

Figure 24

【図25】

物体断面表示プログラムの処理説明図

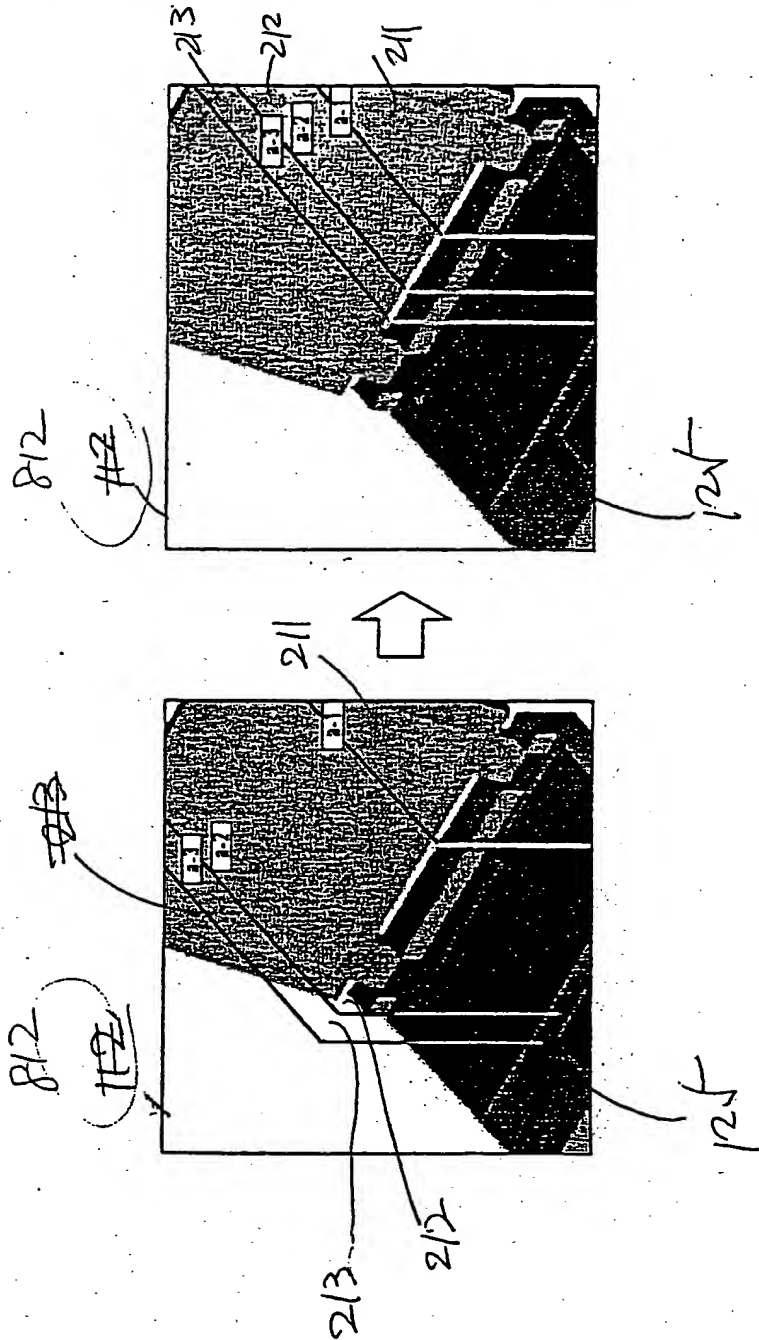


Fig. 25-B

Fig. 25-A

【図26】

物体断面表示プログラムの処理説明図

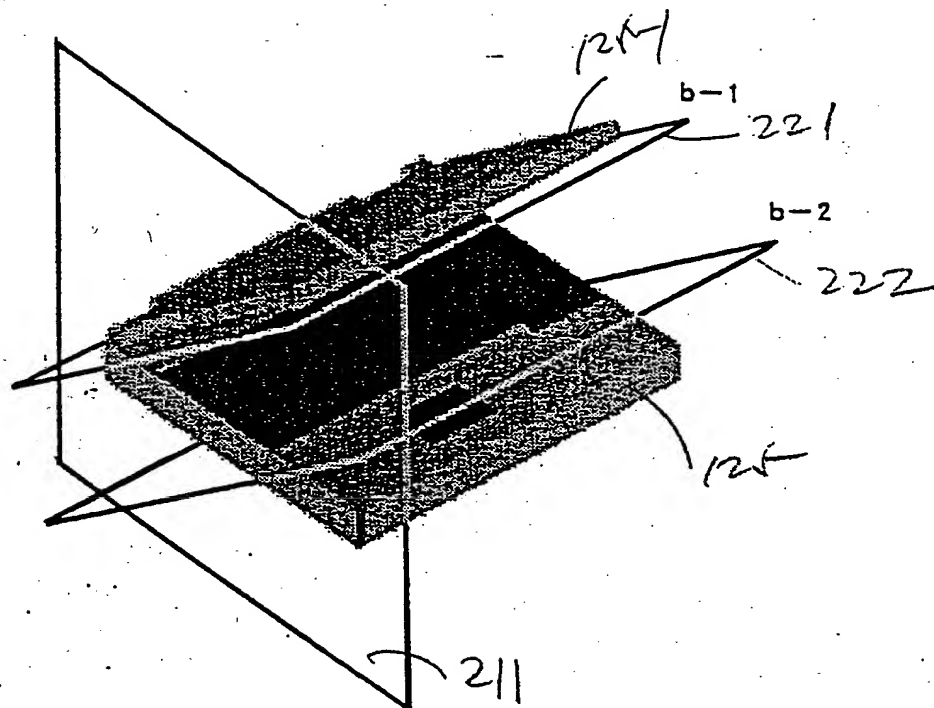
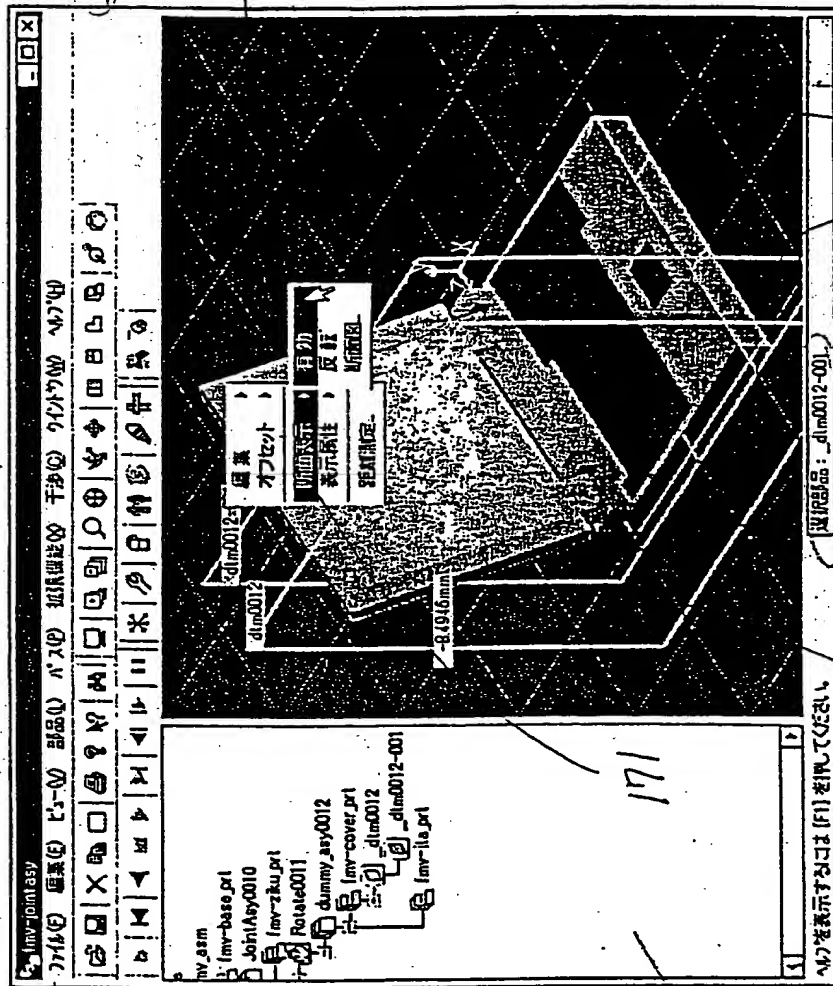


FIGURE 26

【図27】

ディスプレイ画面の説明図

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)



Edit	
Off set	
Displaying section	Validity
Attribute display	Inversion
Measuring distance	Section

【図28】

物体断面表示プログラムの処理説明図

Fig.28A

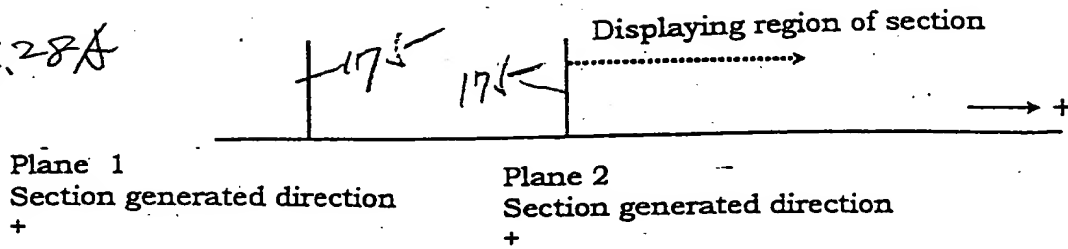


Fig.28B

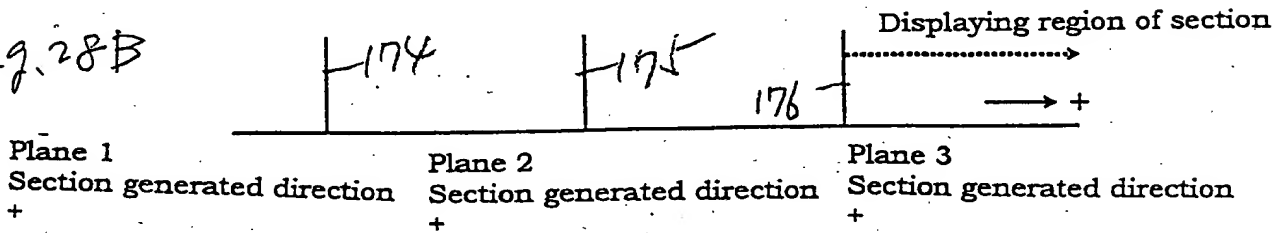


Fig.28C

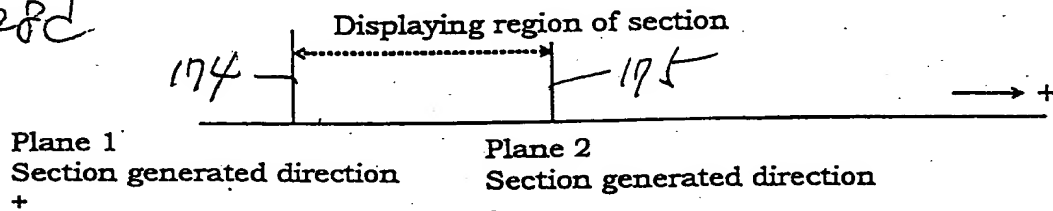
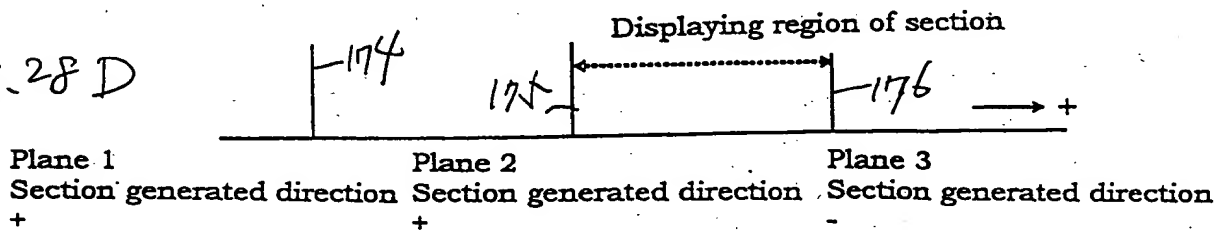


Fig.28D



【圖 29】

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

Edit	
Off set	
Displaying section	Validity
Attribute display	Inversion
Measuring distance	Section

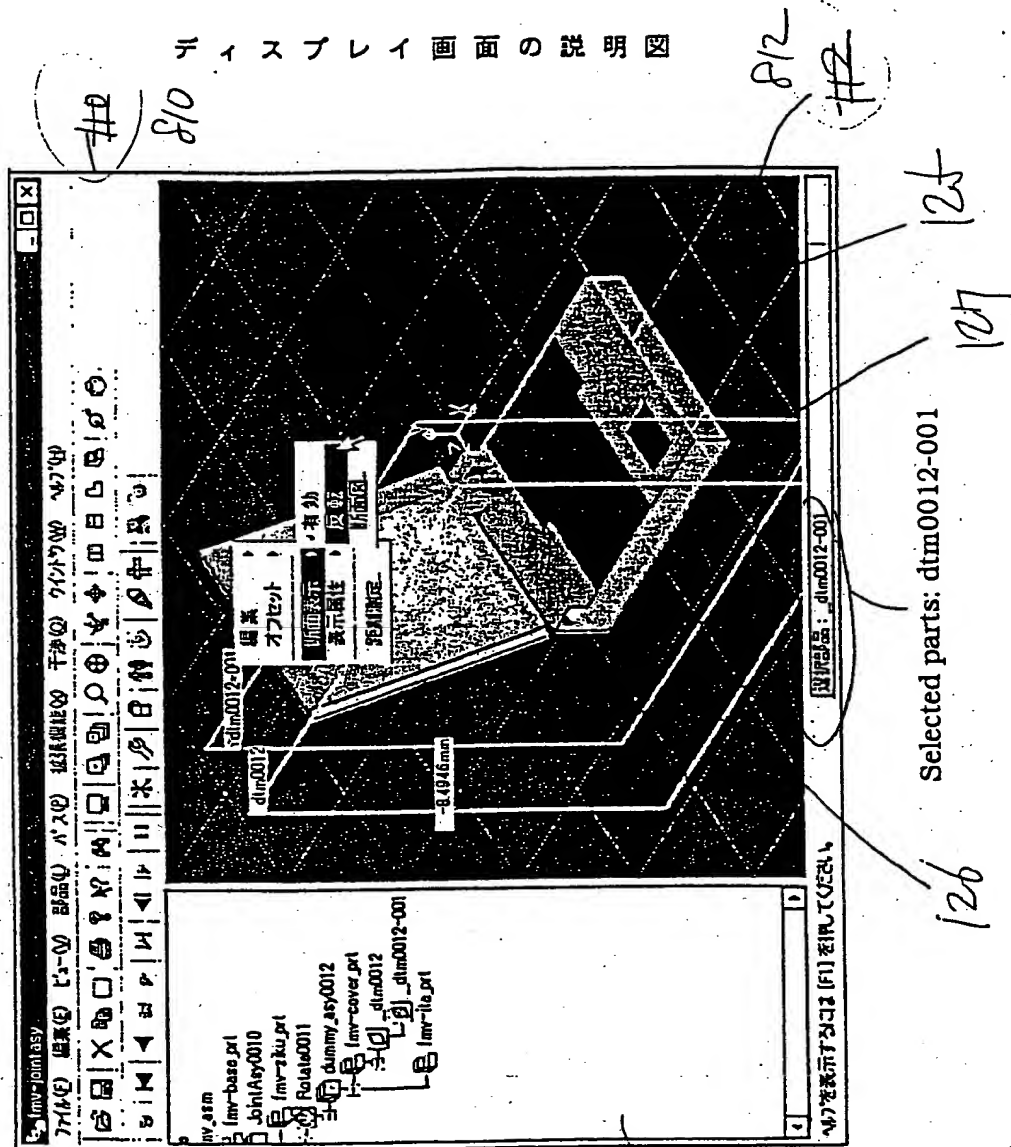
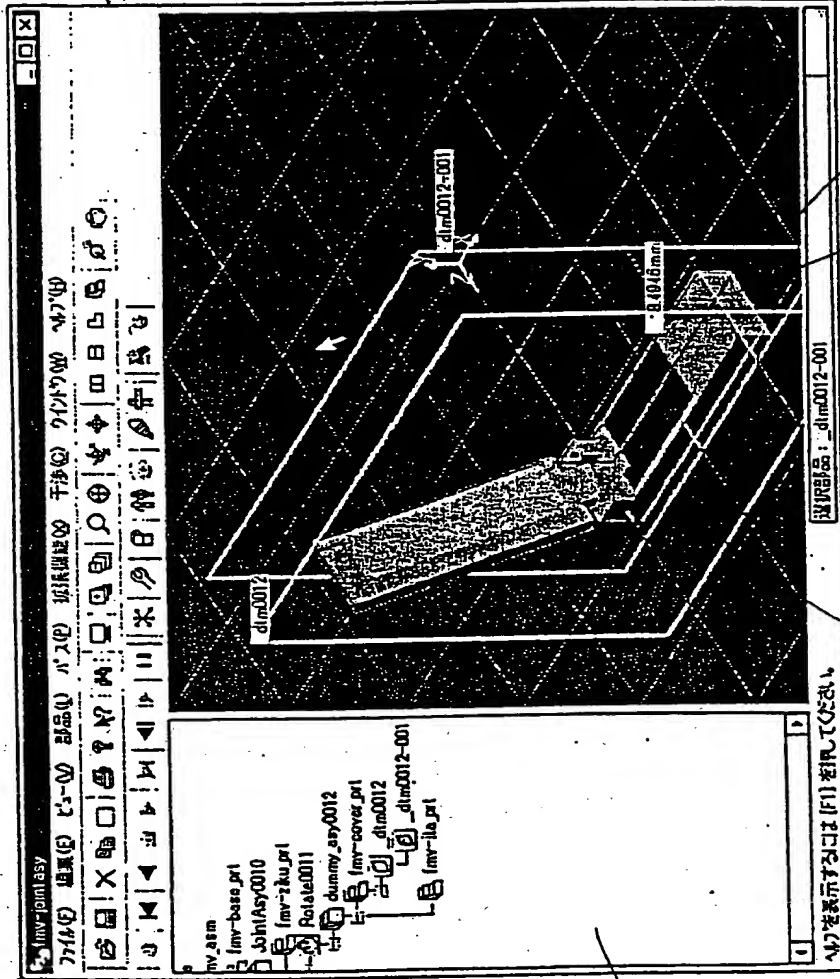


FIGURE 29

【図30】

ディスプレイ画面の説明図

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)



Selected parts dtm0012-001

FIGURE 30

【図31】

ディスプレイ画面の説明図

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

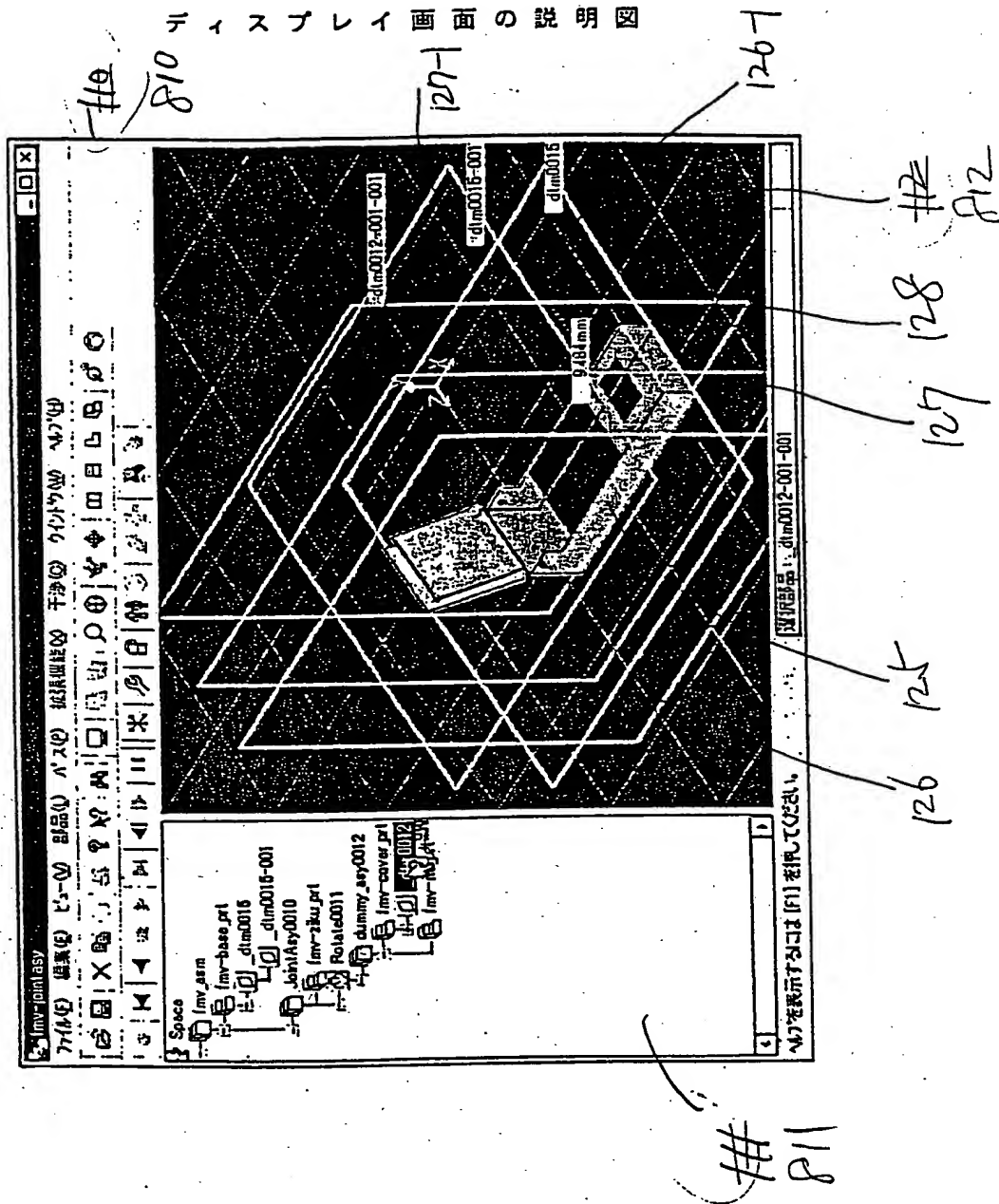


FIGURE 31

【図32】

物体断面表示プログラムの処理説明図

Figure 32A

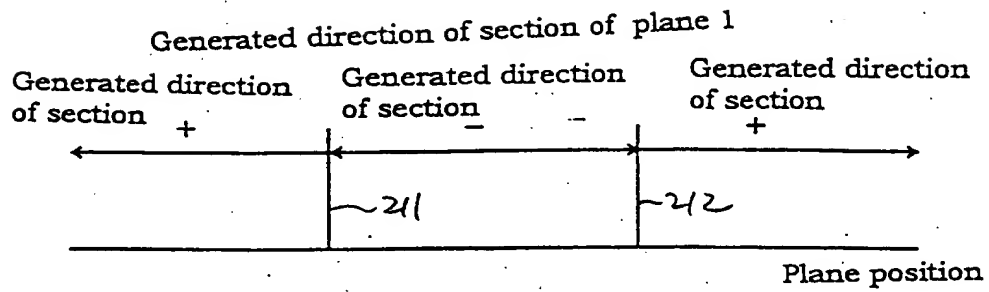


Fig. 32A

Figure 32 B

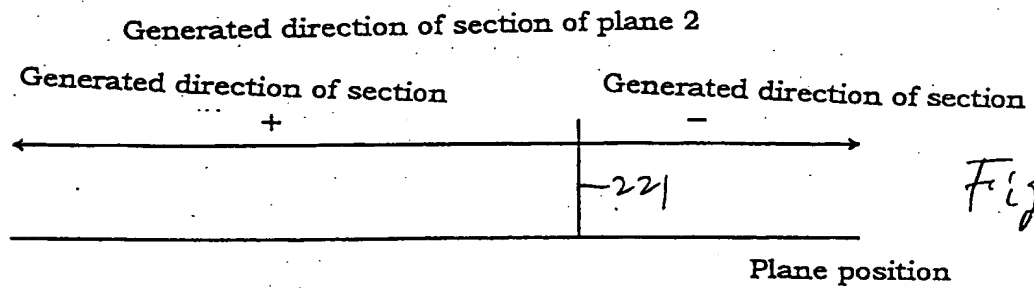


Fig. 32B

Figure 32 C

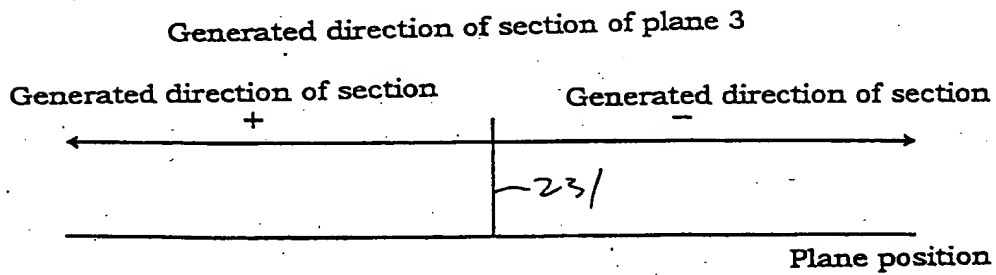


Fig. 32C

【図33】

ディスプレイ画面の説明図

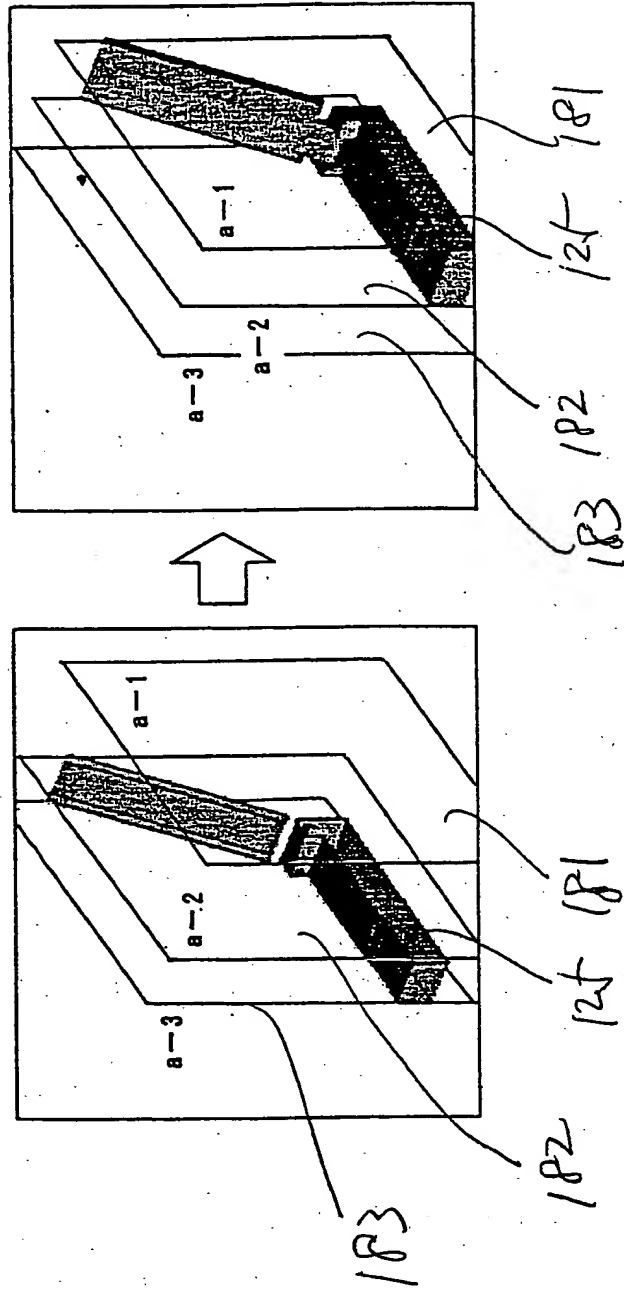


Fig. 33A

Fig. 33B

【図 3 4】

File(F), Edit, View, Parts, Path(P), Expansion function(X), Interference(C)
Window(W), Help(H)

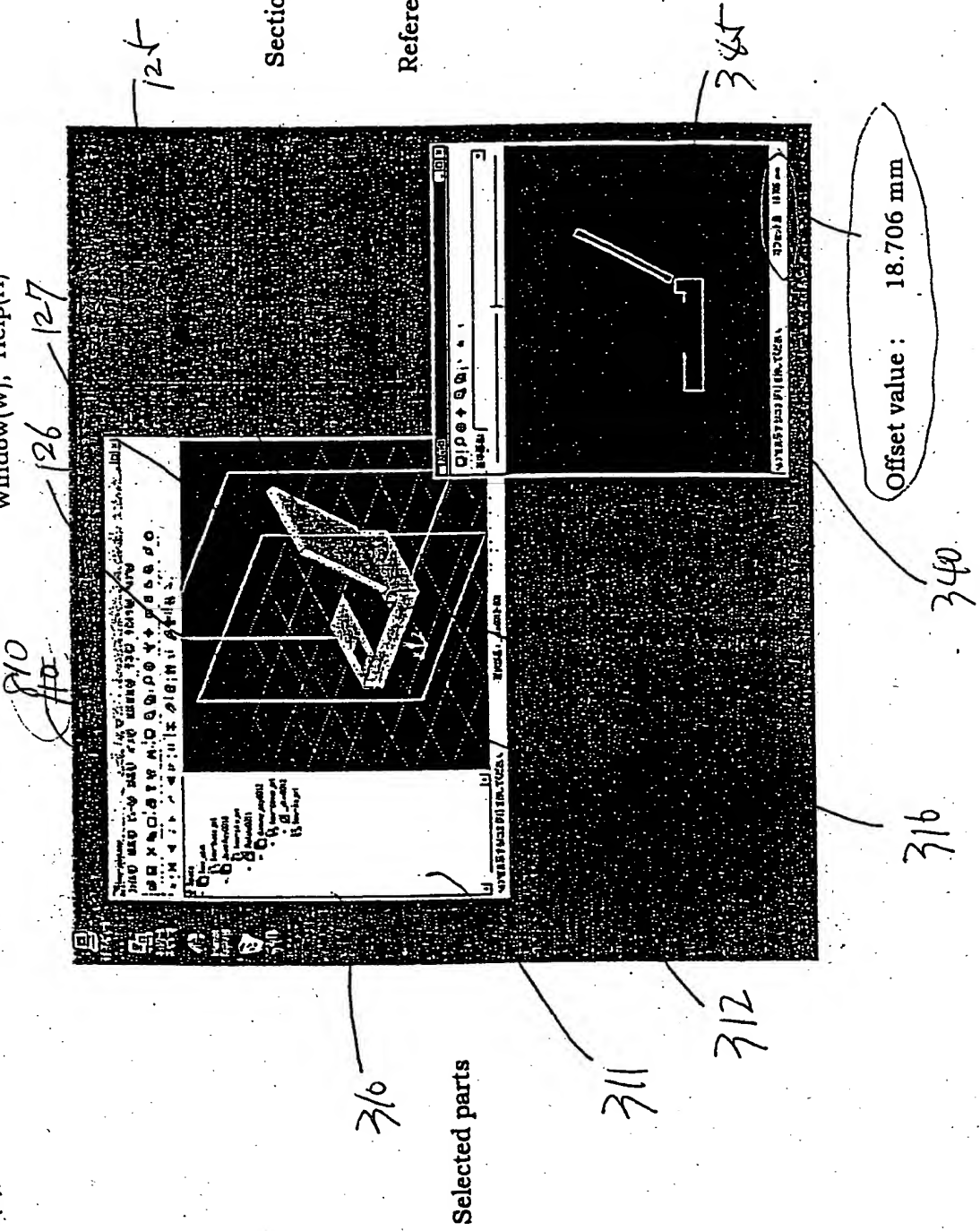
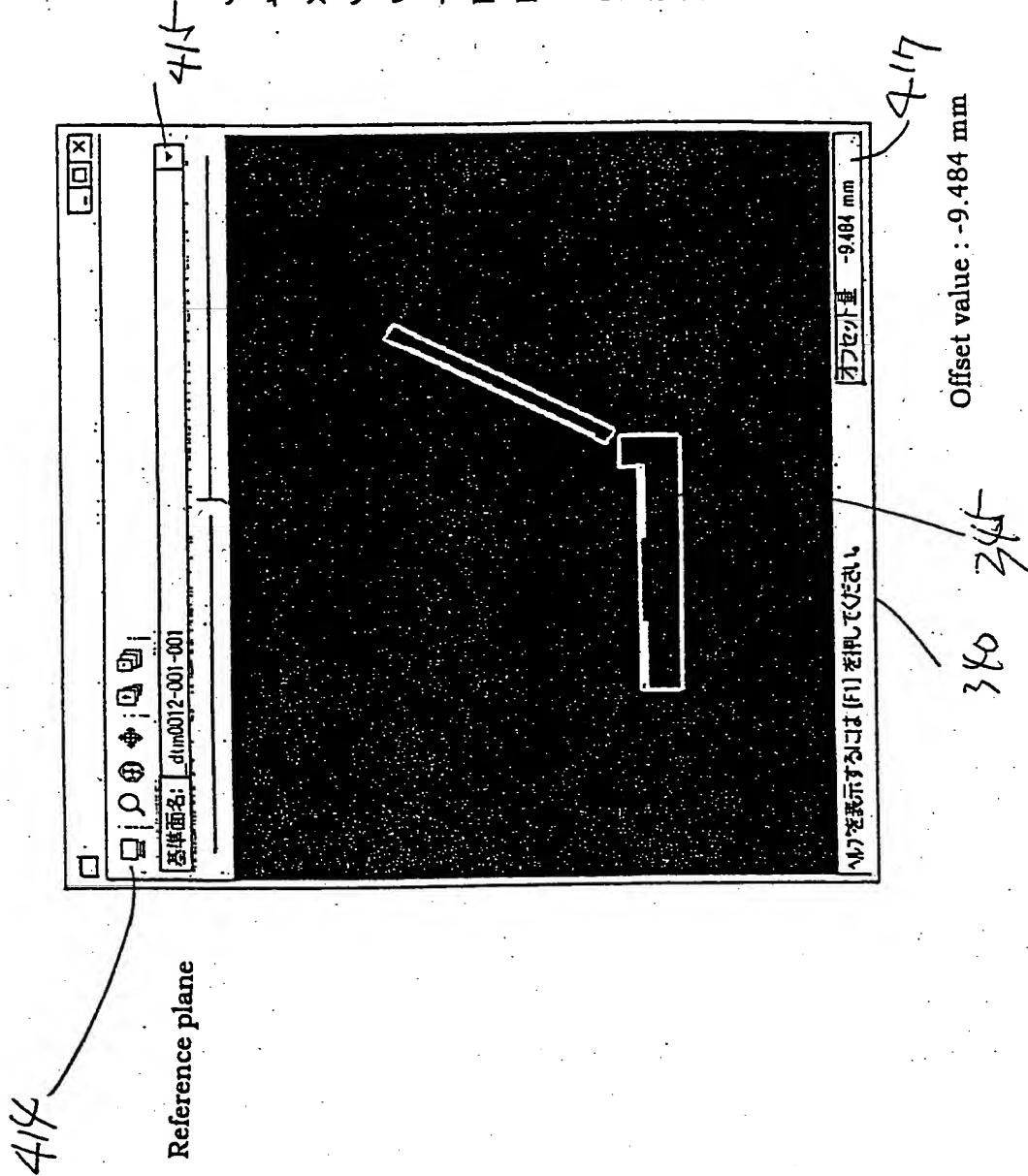


FIGURE 34

【図35】

ディスプレイ画面の説明図



【図36】

物体断面表示プログラムの処理説明図

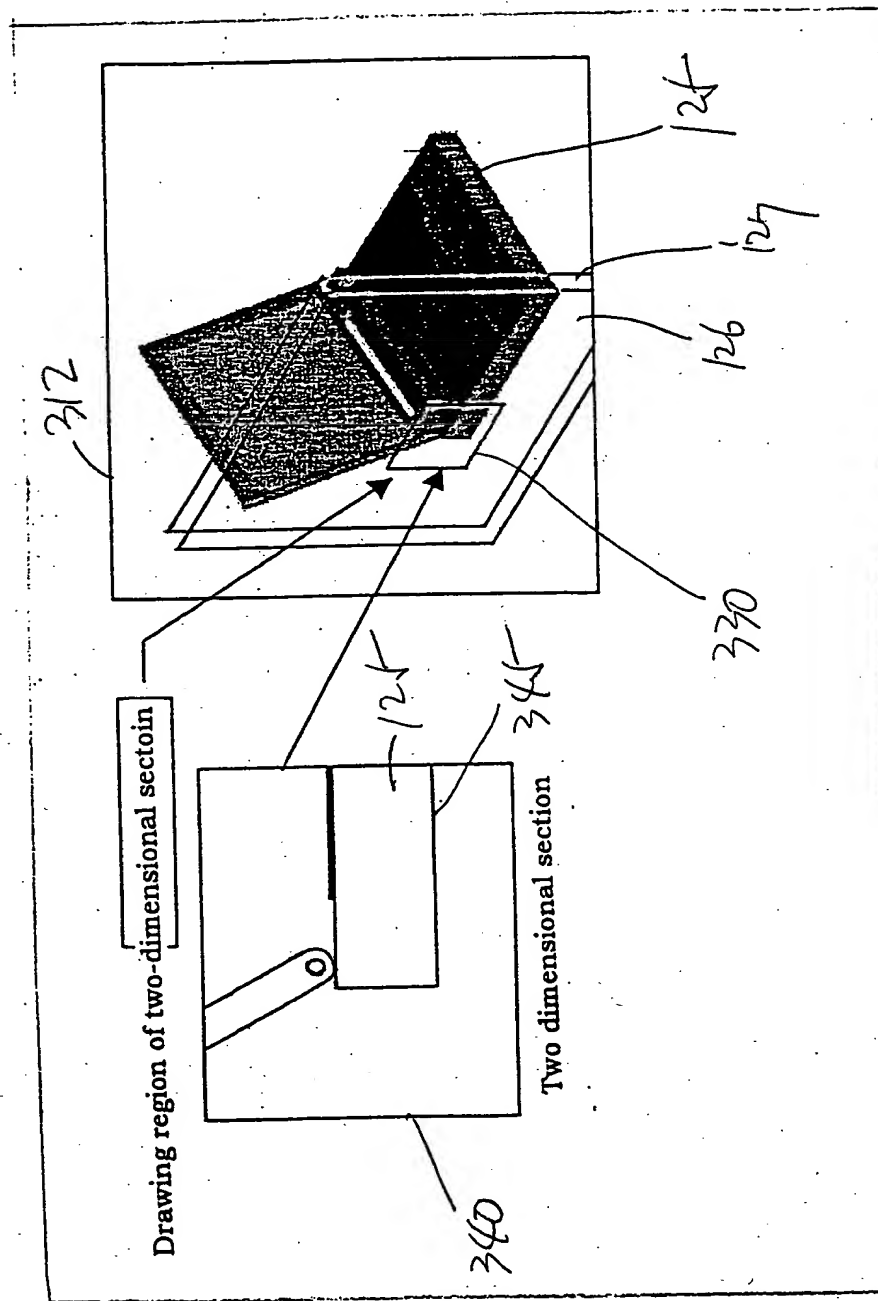


FIGURE 36

【図 37】

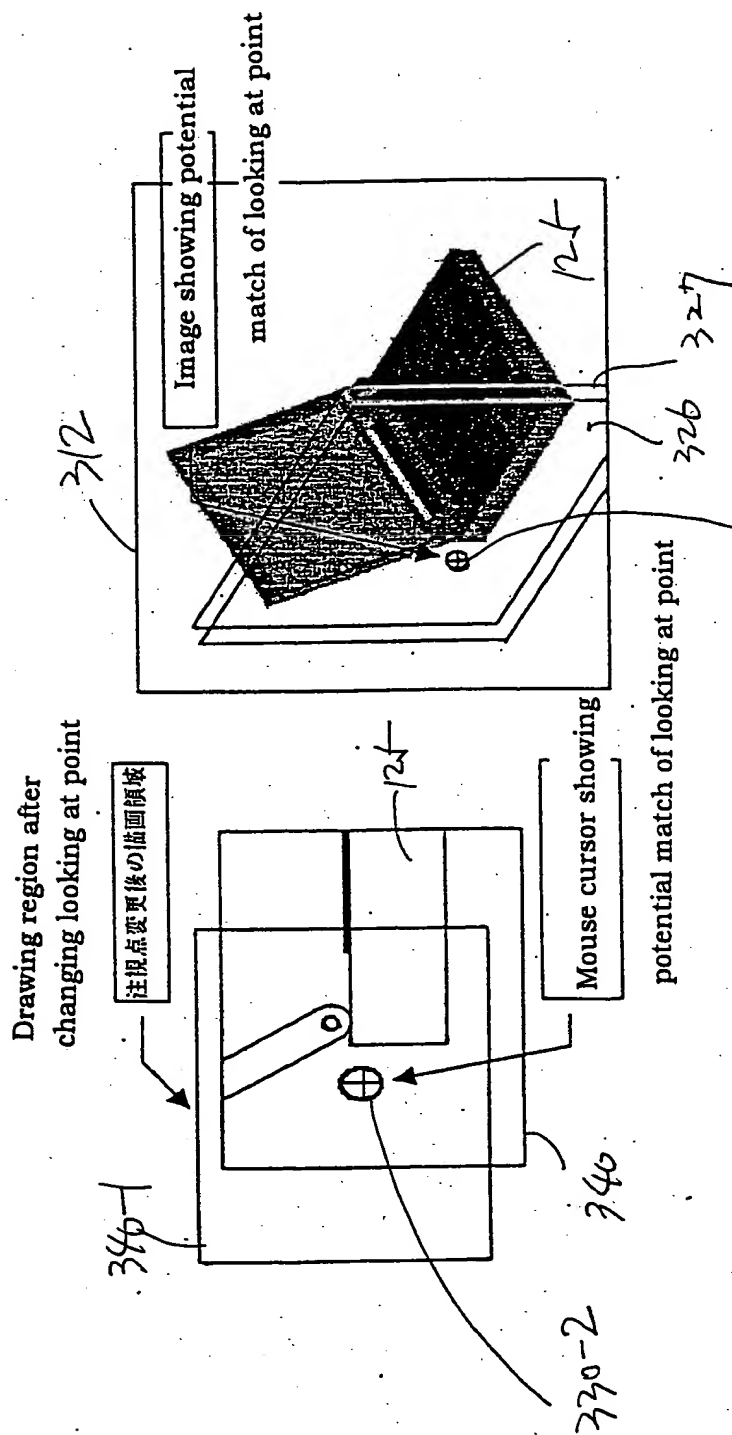
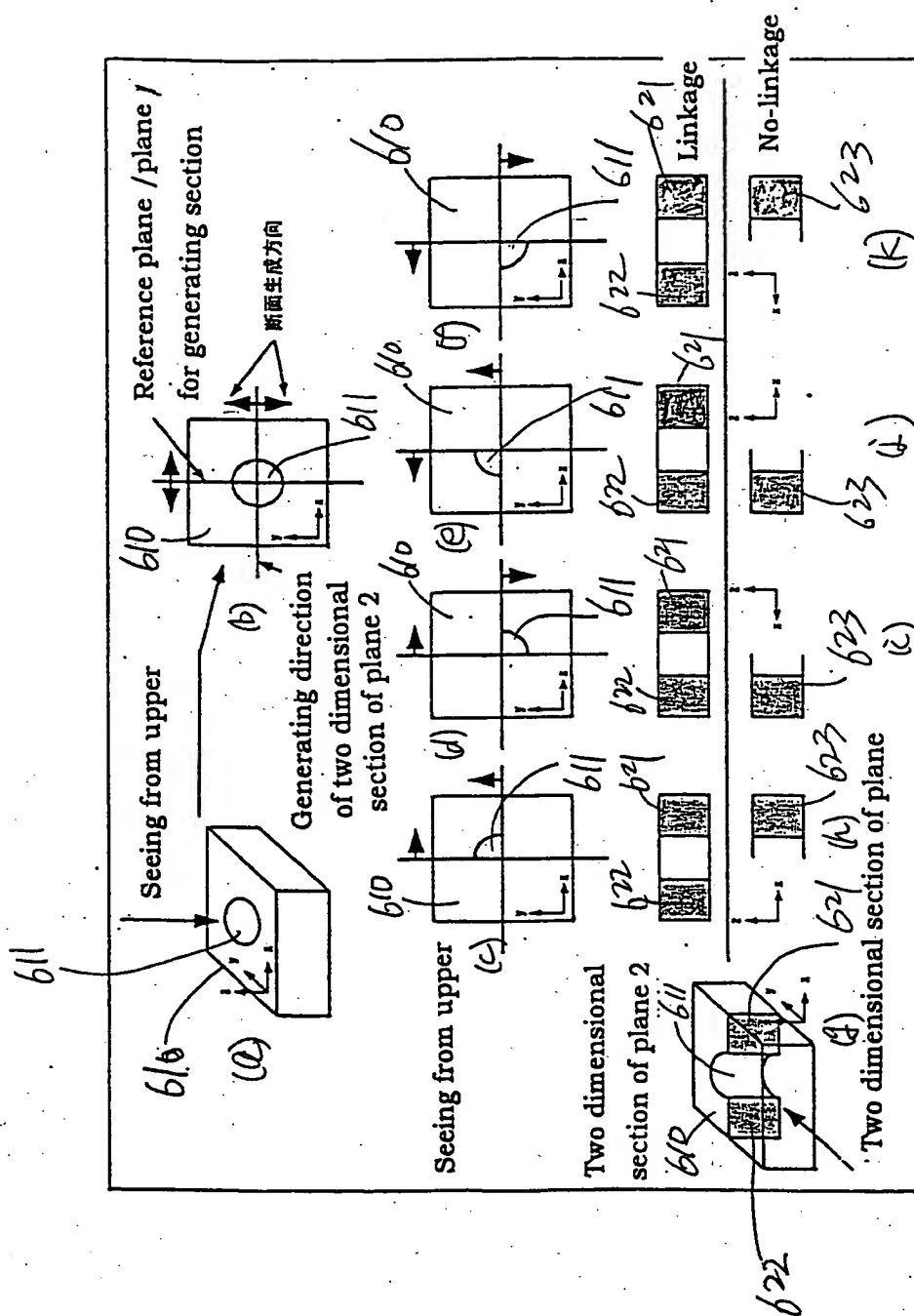


Figure 37 (A)

Figure 37 (B)

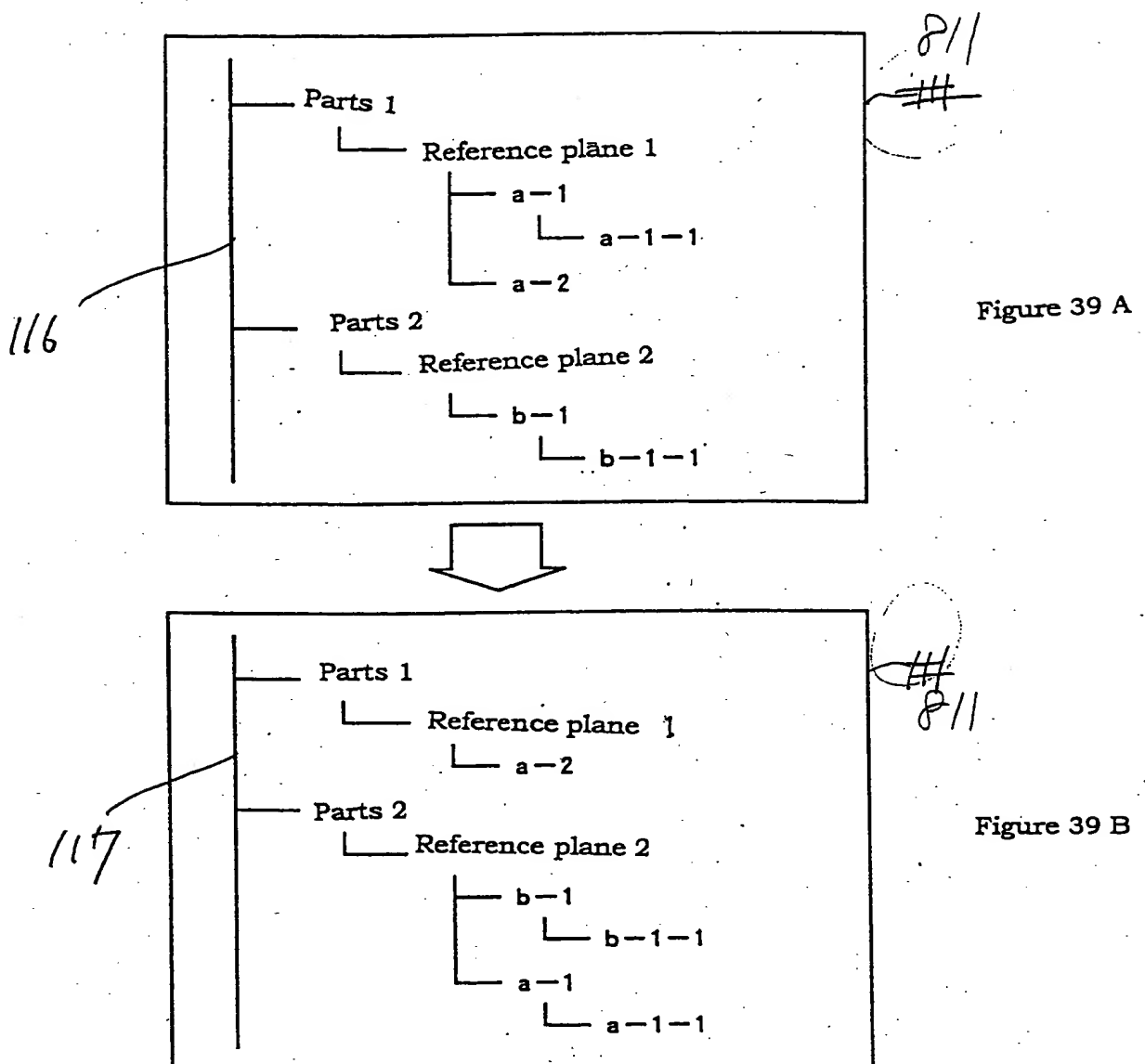
【图 38】

Figure 38



【図39】

物体断面表示プログラムの処理説明図



【図40】

物体断面表示プログラムの処理説明図

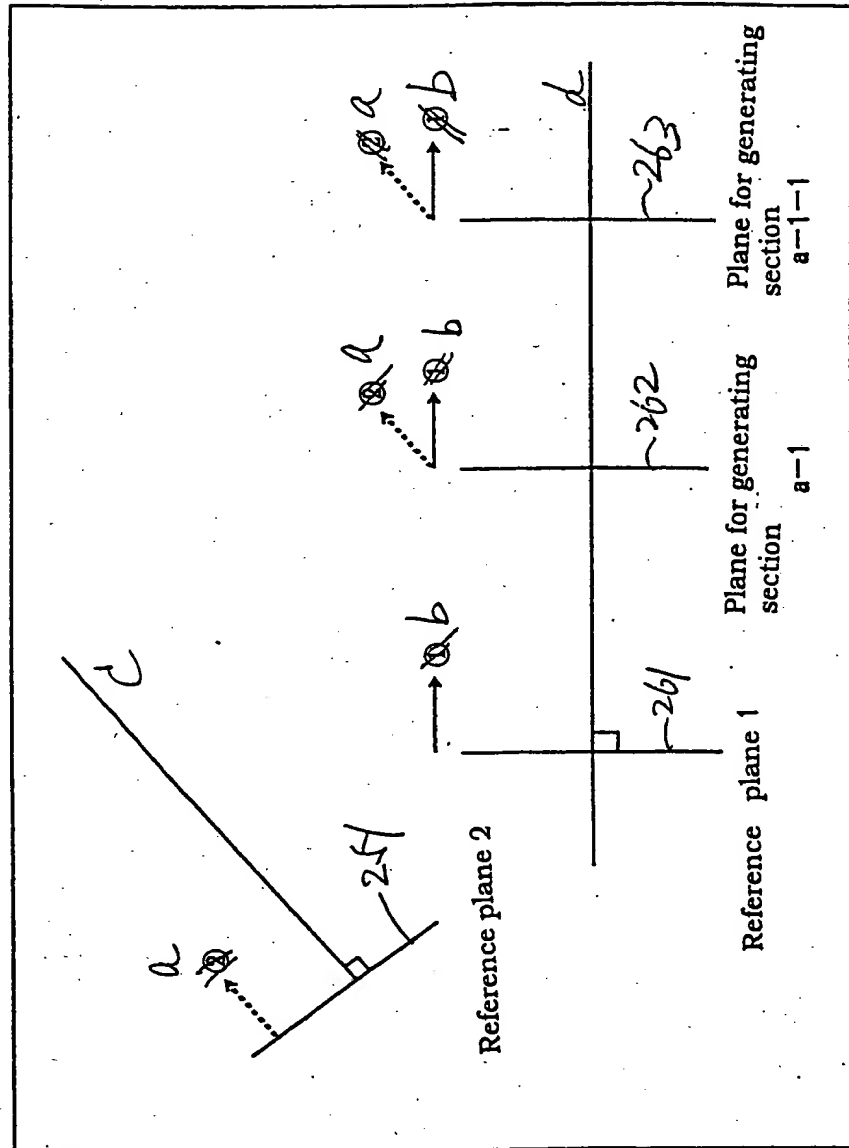


FIGURE 40

【図41】

物体断面表示プログラムの処理説明図

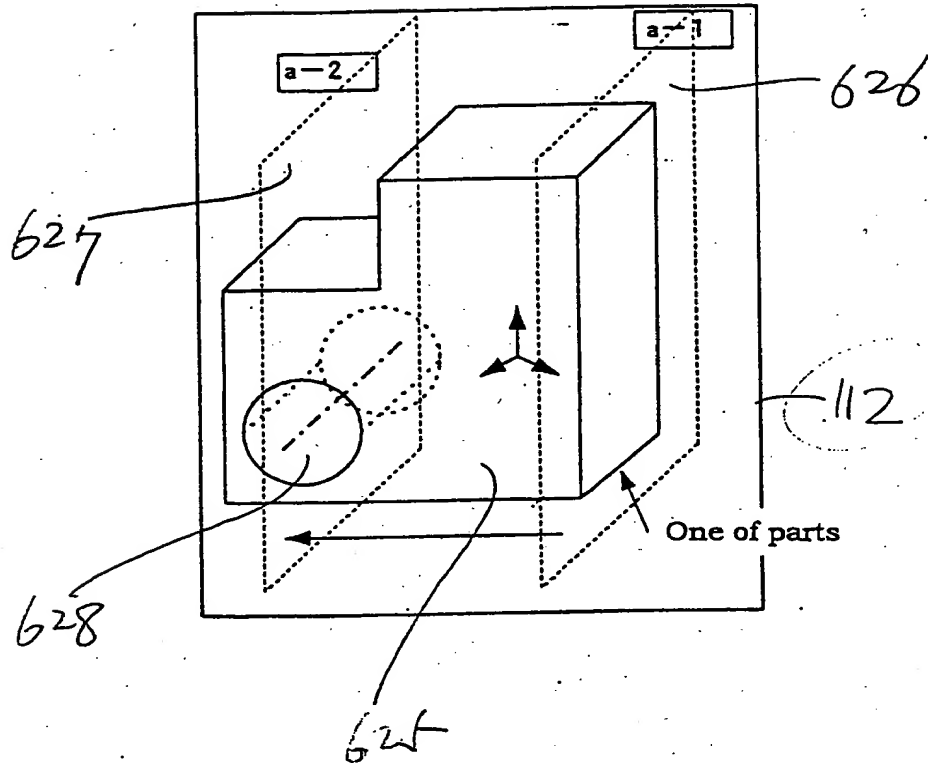


FIGURE 41

【图 42】

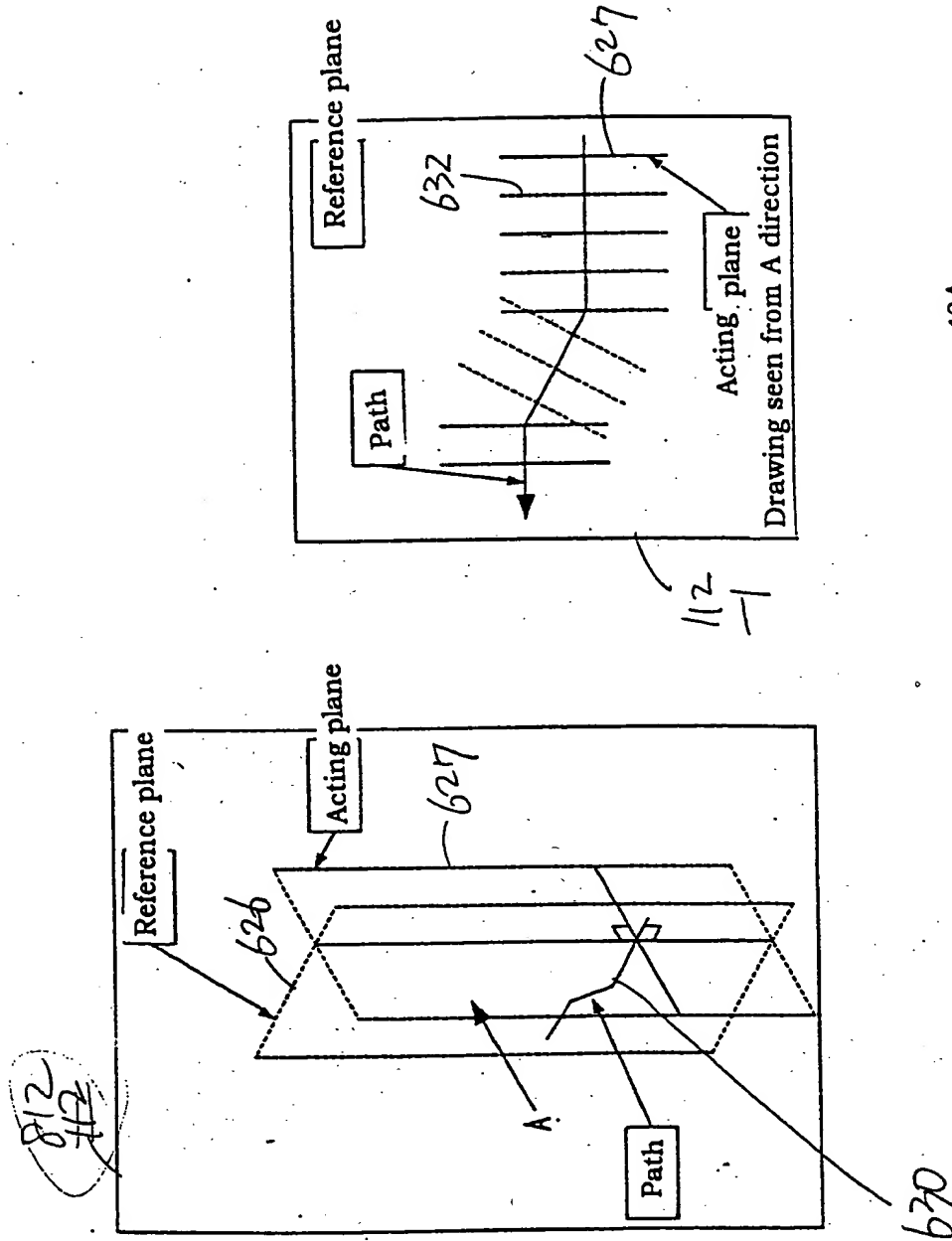


Figure 42A

Figure 42 B

【図43】

物体断面表示プログラムの処理説明図

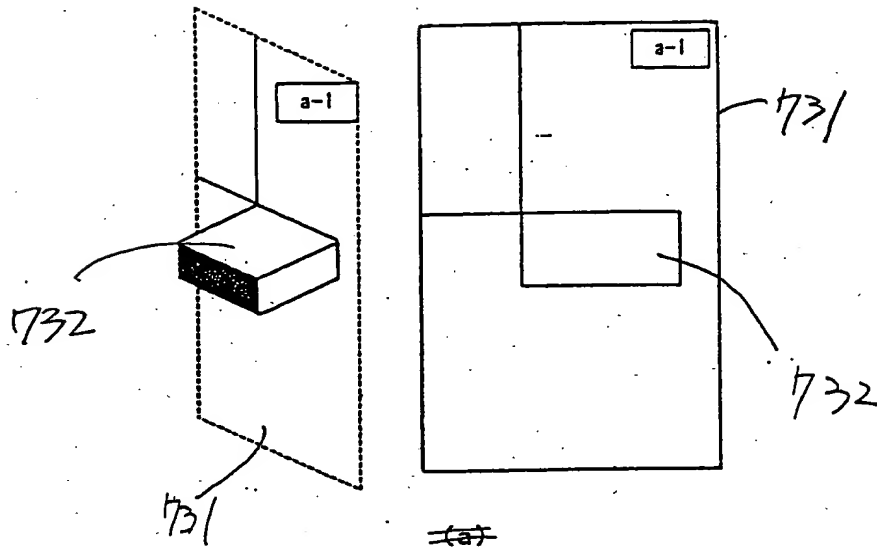


Fig. 43A

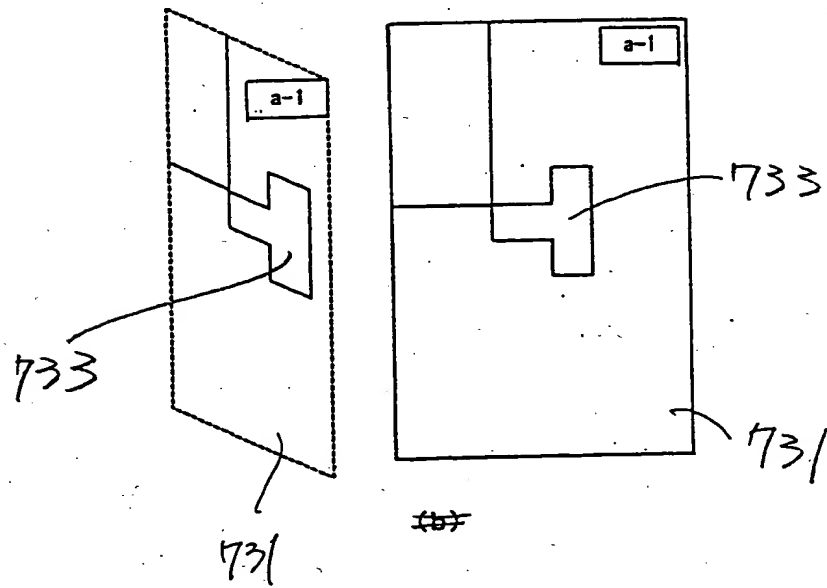


Fig. 43B

【図44】

物体断面表示プログラムの処理説明図

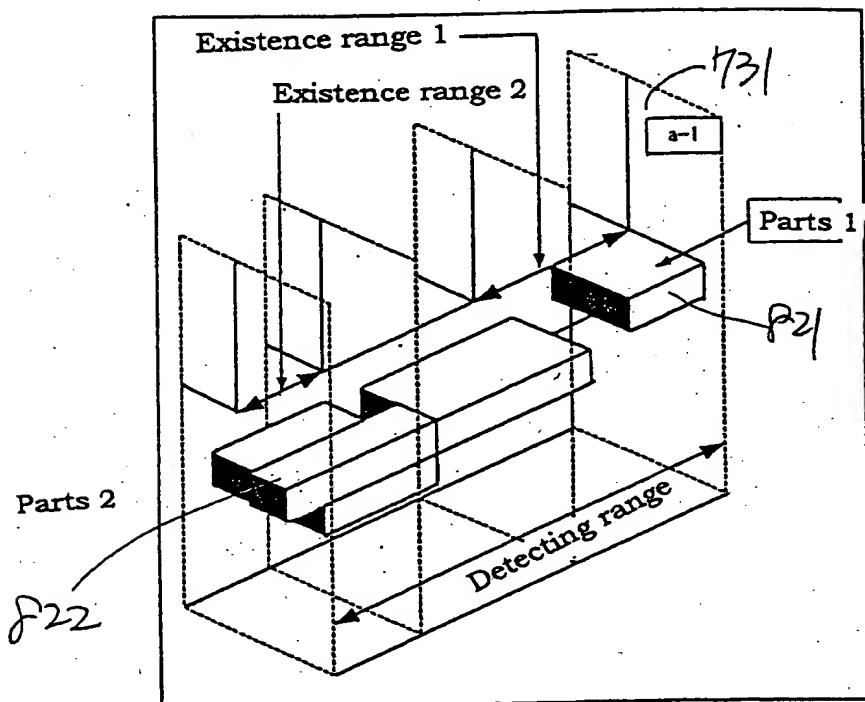


FIGURE 44

【図45】

本発明の機能ブロック図

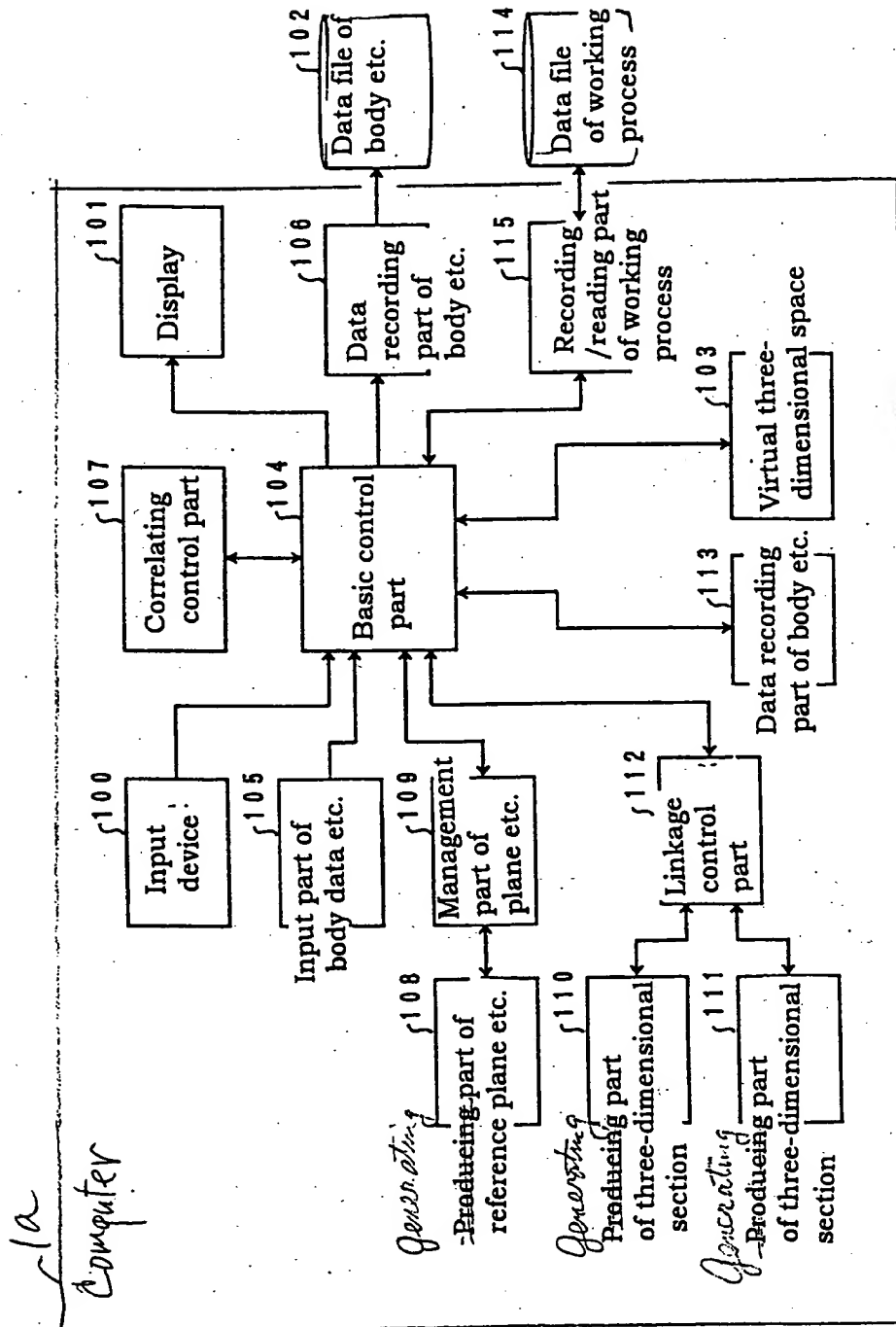
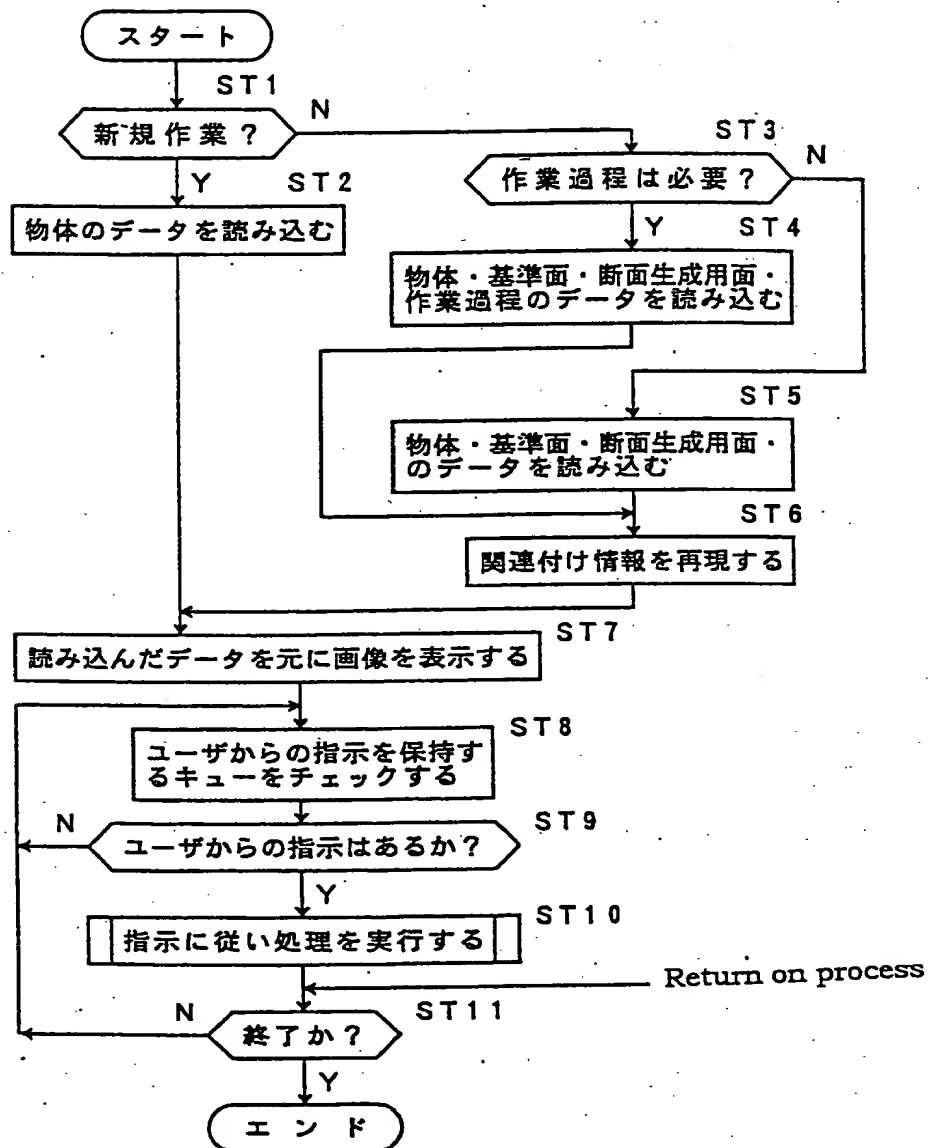


Figure 45

Figure 46

本発明の実行する処理フロー

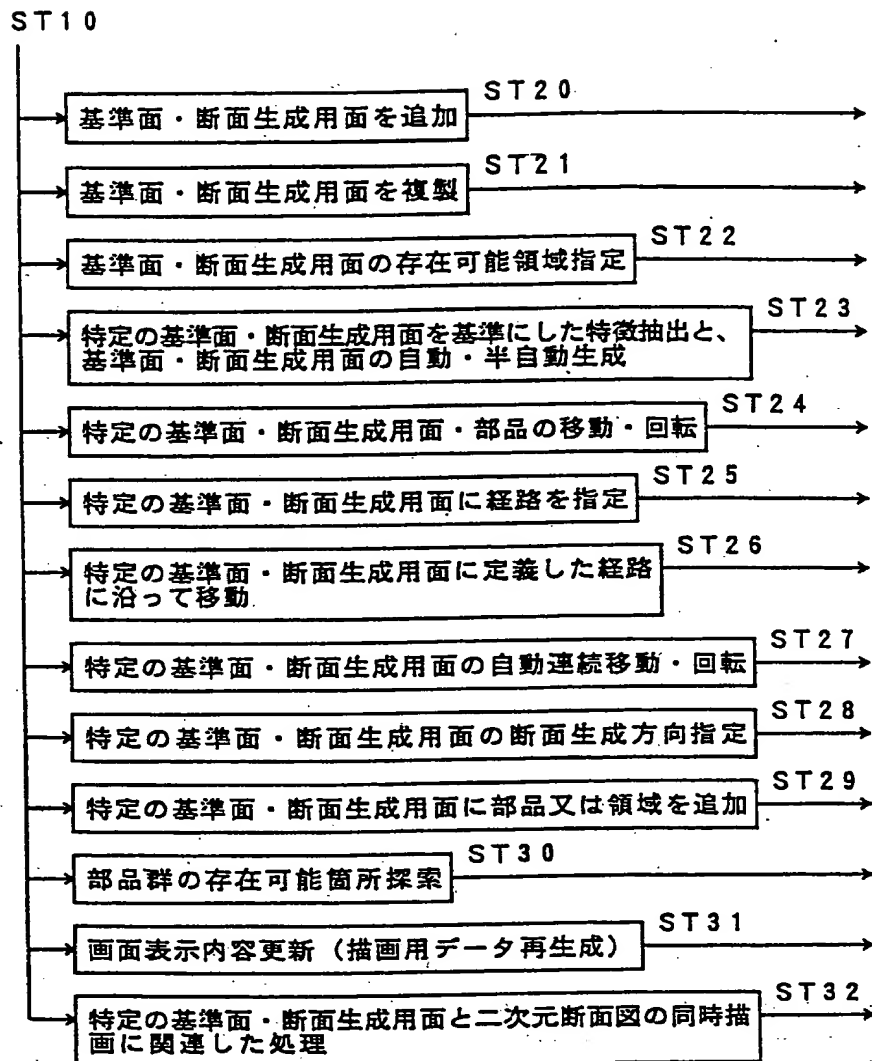


ST1 New work ?
ST2 Read data of body

ST3 Is necessary work history
ST4 Read data of body, reference plane, plane
for generating cross section and work history
ST5 Read data of body, reference plane, plane
for generating cross section
ST6 Reproduce relation information

ST7 Display image based on the read data
ST8 Check queue keeping directions from a user
ST9 Is there direction of a user
ST10 Implement execute process according to direction
ST11 End of process ?

本発明の実行する処理フロー



ST20 Addition of reference plane/ plane for generating cross section

ST21 Copy of reference plane/ plane for generating cross section

ST22 Direction of allowable region of reference plane /plane for generating cross section

ST23 Extraction based on specified reference plane /plane for generating cross section, and automatic / semiautomatic generation of reference plane / plane for generating cross section

ST24 Transfer / rotation of specified reference, plane for generating cross section and parts

ST25 Direction of path on specified reference plane / plane for generating cross section

ST26 Move along the route along the path reference plane / plane for generating Cross section

ST27 Automatic succeeding transfer and rotation of specified reference plane / plane for generating cross section

ST28 Request of direction of plane for generating cross section for specified reference plane / plane for generating cross section

ST29 Addition of parts and region in the specified reference plane / plane for generating cross section

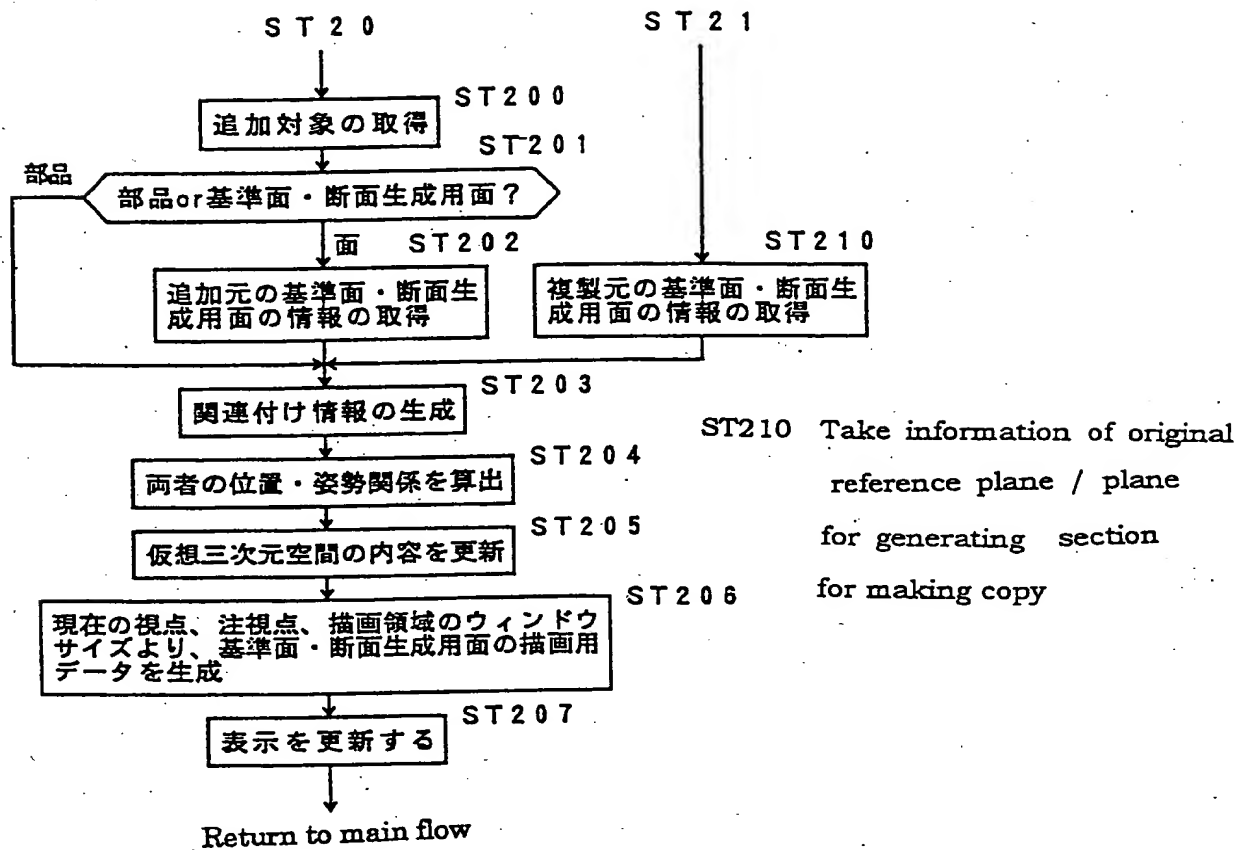
ST30 Allowable region of parts existing Detection of allowable region of parts existing

ST31 Update of display (regeneration of image data

ST32 Process concerning to image simultaneously specified reference plane / plane for generating cross section and two dimensional cross section

Figure 48

本発明の実行する処理フロー



ST200 Take the addition object

ST201 Parts or reference plane / plane for generating cross section ?

ST202 Take information of original reference plane / plane for generating cross section for addition

ST203 Create information on relation

ST204 Calculate position / pose relation thereof

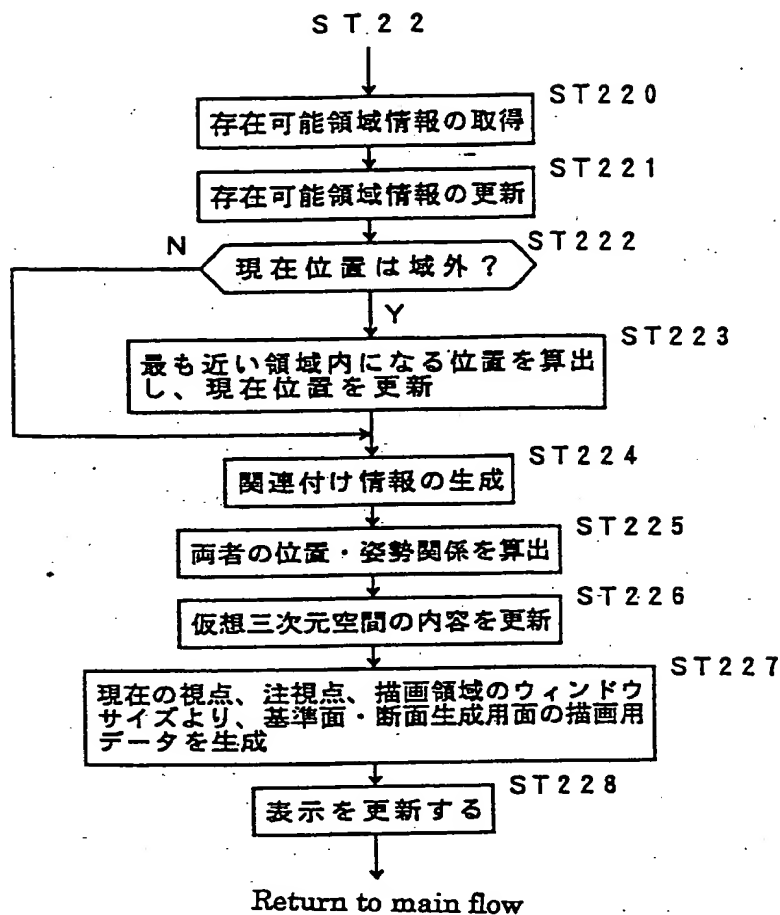
ST205 Update contents of virtual three dimensional cross section

ST206 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST207 Update display

Figure 49

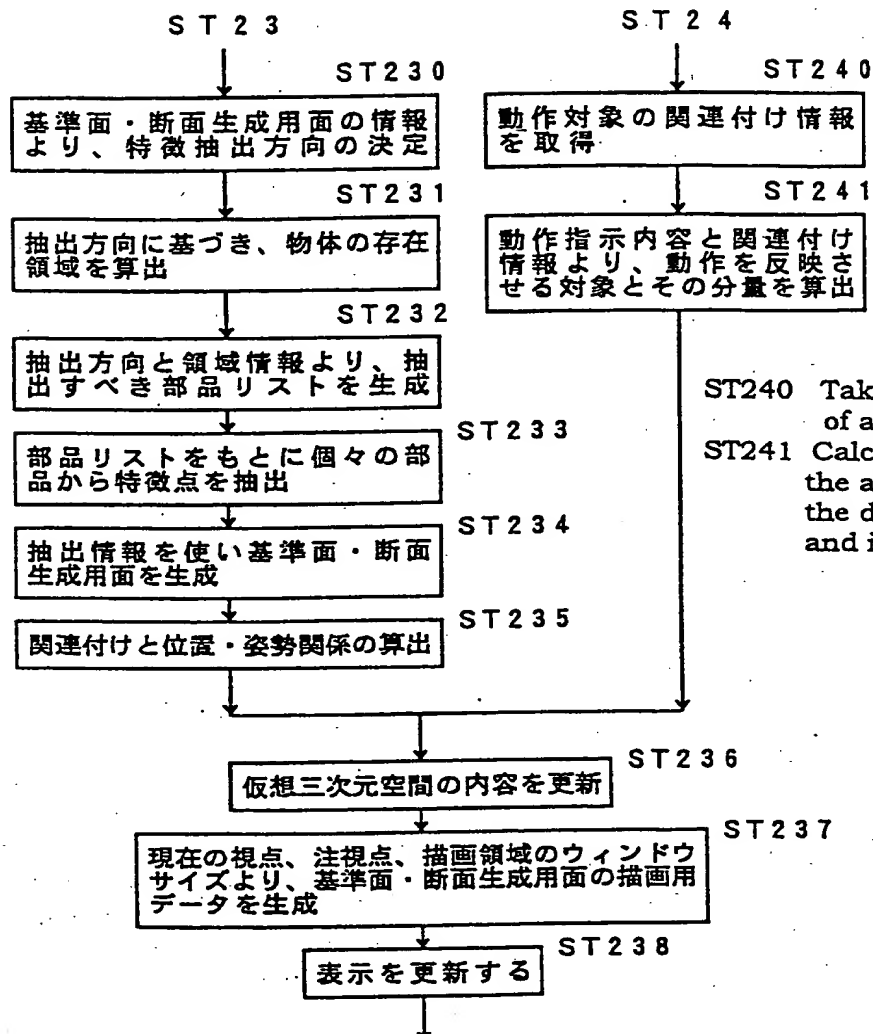
本発明の実行する処理フロー



- ST220 Take information of allowable region of existence
- ST221 Update information of allowable region of existence
- ST222 Present position is out of the region ?
- ST223 Calculate the nearest position in the region, and update present position
- ST224 Generate information of relation
- ST225 Calculate position / pose relation thereof
- ST226 Update virtual three dimensional cross section
- ST227 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region
- ST228 Update display

Figure 50

本発明の実行する処理フロー

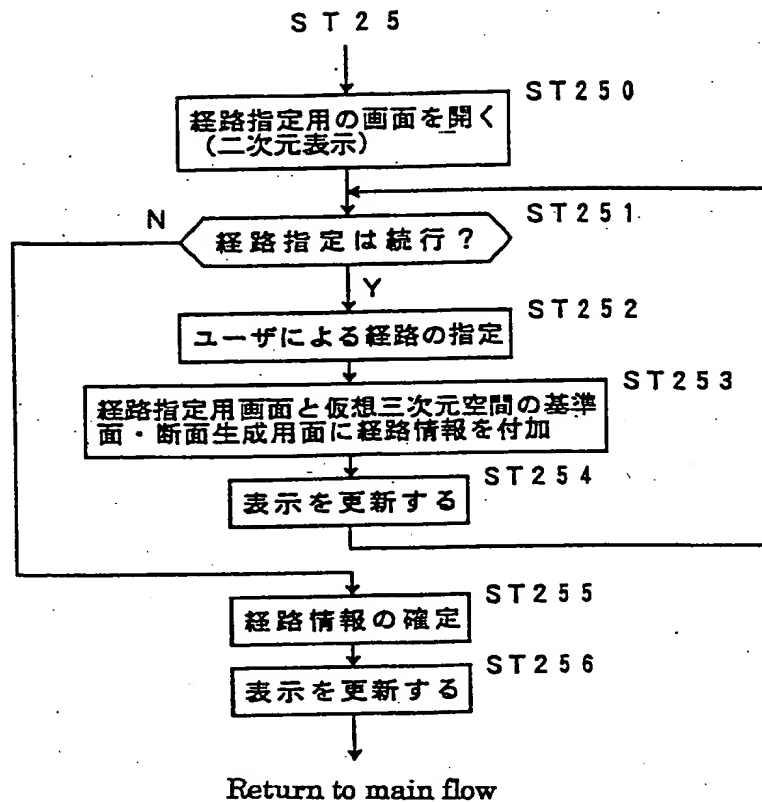


ST240 Take information of relation of action object
ST241 Calculate object reflecting the action and the value from the direction of action and information of relation

- ST230 Determine of specified extraction from information of reference plane / plane for generating cross section
- ST231 Calculate allowance region of body existing based on the extracted direction
- ST232 Generate parts list for extracting from extracting direction and information of region
- ST233 Extract specified point from each of parts based on parts list
- ST234 Generate reference plane / plane for generating cross section
- ST235 Calculate relation and position / pose relation
- ST236 Update virtual three dimensional cross section
- ST237 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region
- ST238 Update display

Figure 51

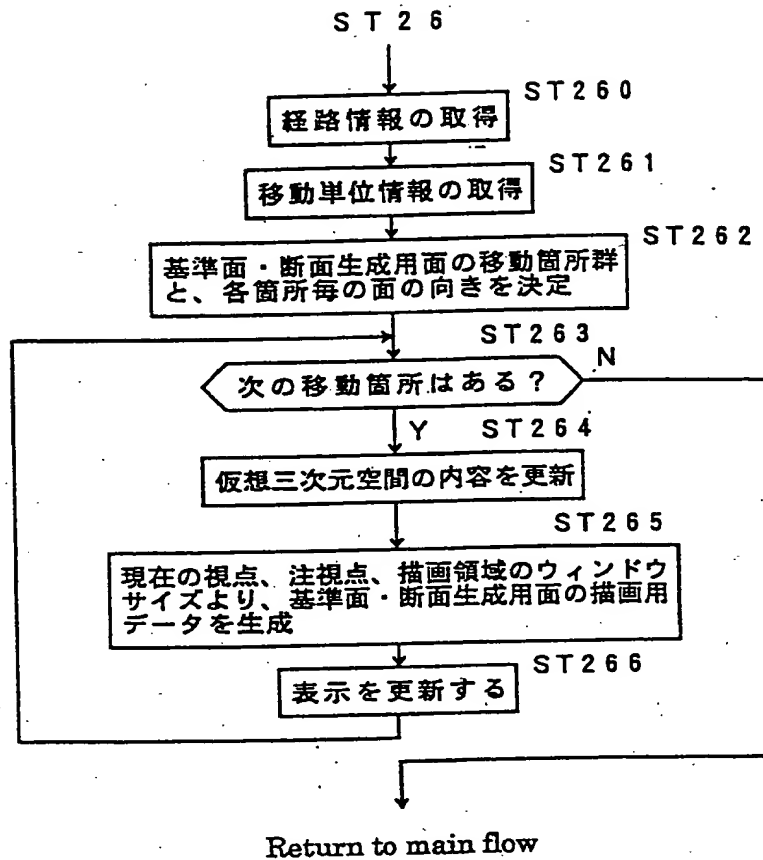
本発明の実行する処理フロー



- ST250 Open screen for directing path (two dimensional display)
- ST251 Continue direction of path
- ST252 Direction of path by a user
- ST53 Add path information to screen for directing path, reference plane / plane for generating cross section in virtual three dimensional space
- ST254 Update display
- ST255 Determine path information
- ST256 Update display

Figure 52

本発明の実行する処理フロー



ST260 Take path information

ST261 Take information of moving unit.

ST262 Determine moved points group of reference plane and plane for generating cross section, and direction of the plane at each position

ST263 Is there next moving place ?

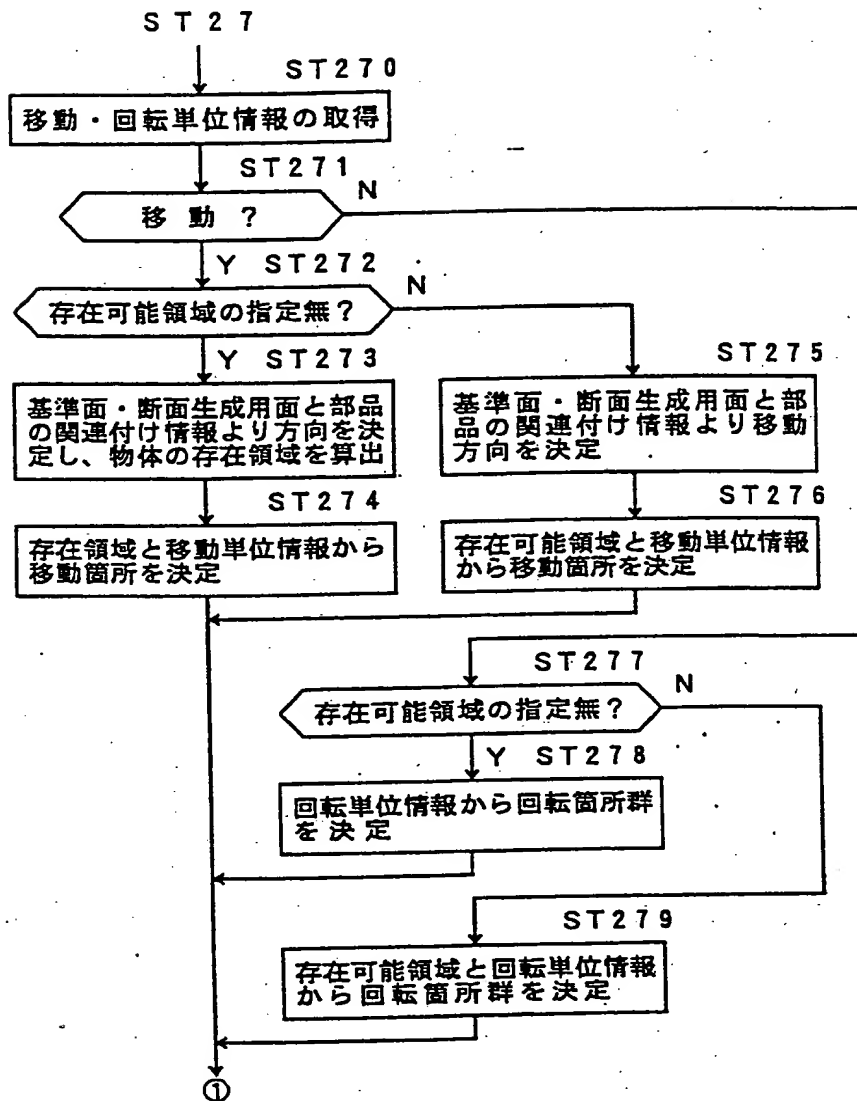
ST 265 Update of contents in virtual three dimensional space

ST265 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST266 Update display

Figure 53

本発明の実行する処理フロー



ST270 Take transfer / rotation

ST271 Transfer

ST272 Direction of allowable region of existence is there ?

ST273 Determine direction from reference plane / plane for generating cross section and information of relation of parts, and calculate allowable region of body.

ST274 Determine moved place from the existence region and information of transfer

ST275 Determine direction of transfer place from the existence region and information of relation of parts

ST276 Determine moved place from the existence region and information of transfer unit

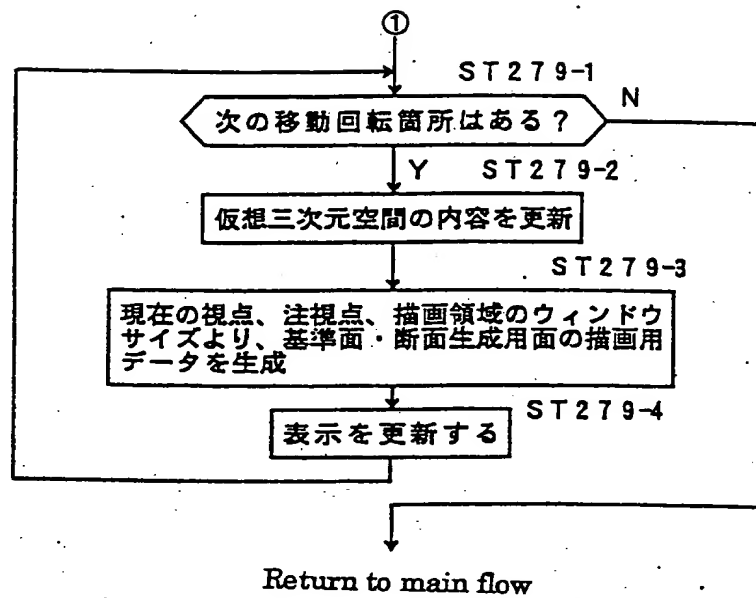
ST277 Allowable region of existence

ST278 Determine group of rotation points

ST279 Determine rotation points group from allowable region of existence and information of rotation unit

Figure 54

本発明の実行する処理フロー



ST 279-1 Is there next transfer/rotation point ?

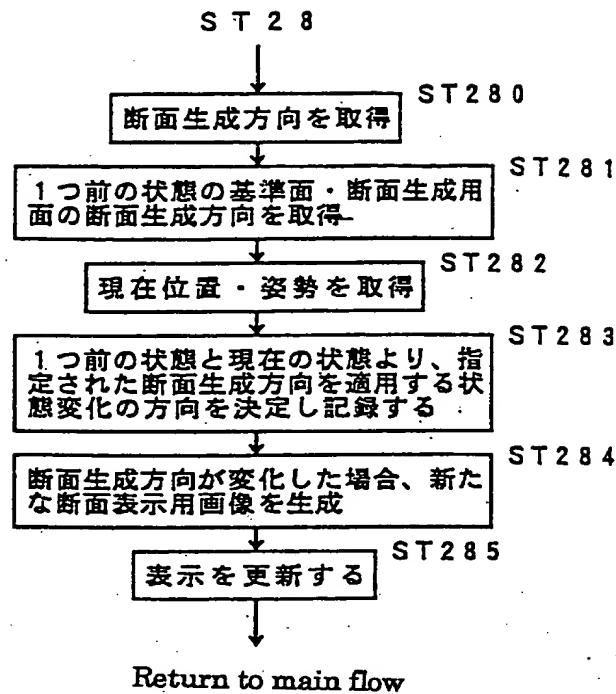
ST279-2 Update contents of virtual three dimension space

ST279-3 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

ST279-4 Update display

Figure 55

本発明の実行する処理フロー



ST280 Take direction of cross section

ST281 Take direction generated cross section of just before reference plane / plane for generating cross section

ST282 Take present position / pose

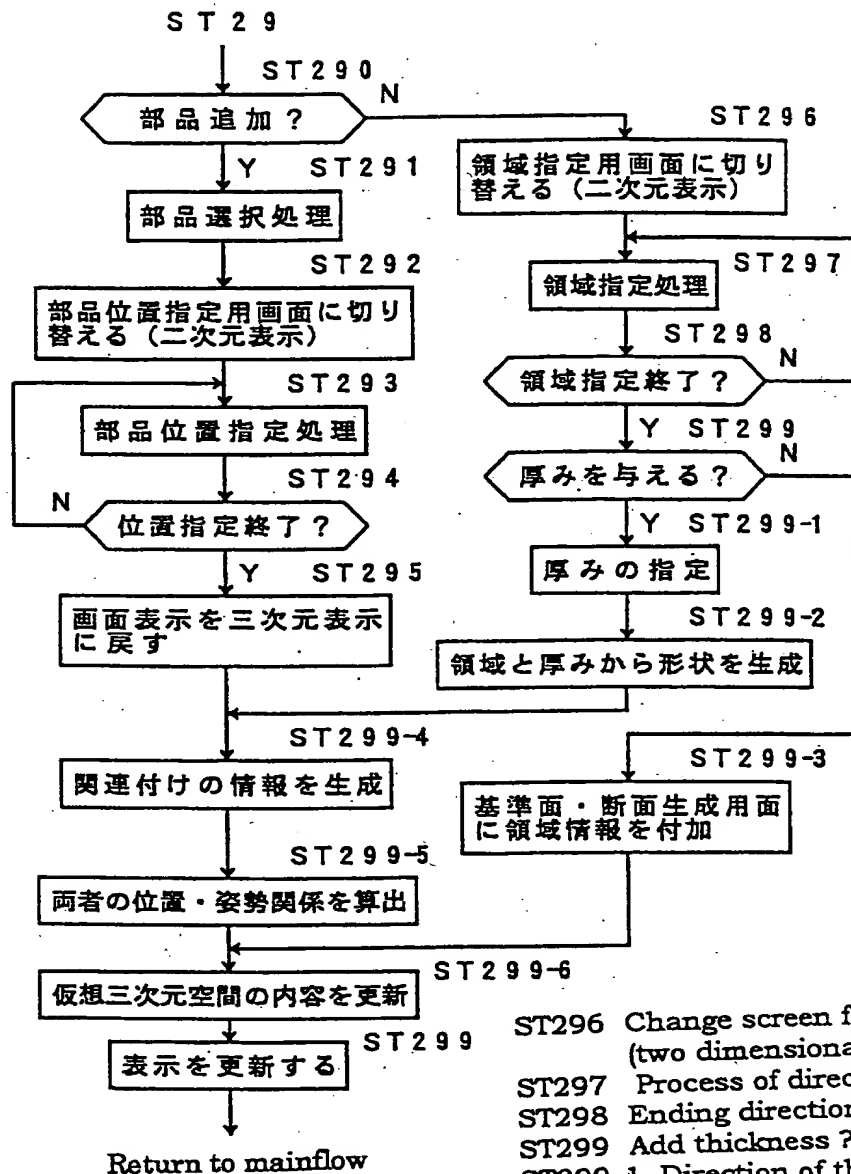
ST283 Determine direction of state change applying the direction for generating cross section from just before state and present state, and register it

ST284 Generate image of new plane for generating in case of direction for generating cross section

ST285 Update display

Figure 56

本発明の実行する処理フロー



ST290 Add parts ?

ST291 Process selecting parts

ST292 Change screen for directing parts
position (for two dimensional display)

ST293 Process for directing parts position

ST294 End of direction of position ?

ST295 Return screen to three dimensional
displayST299-4 Generate information of relation
ST299-5 Calculate position/pose relation
thereofST299-6 Update contents of virtual three
dimensional cross section

ST299-7 Update display

ST296 Change screen for directing region
(two dimensional)

ST297 Process of direction of region

ST298 Ending direction of region ?

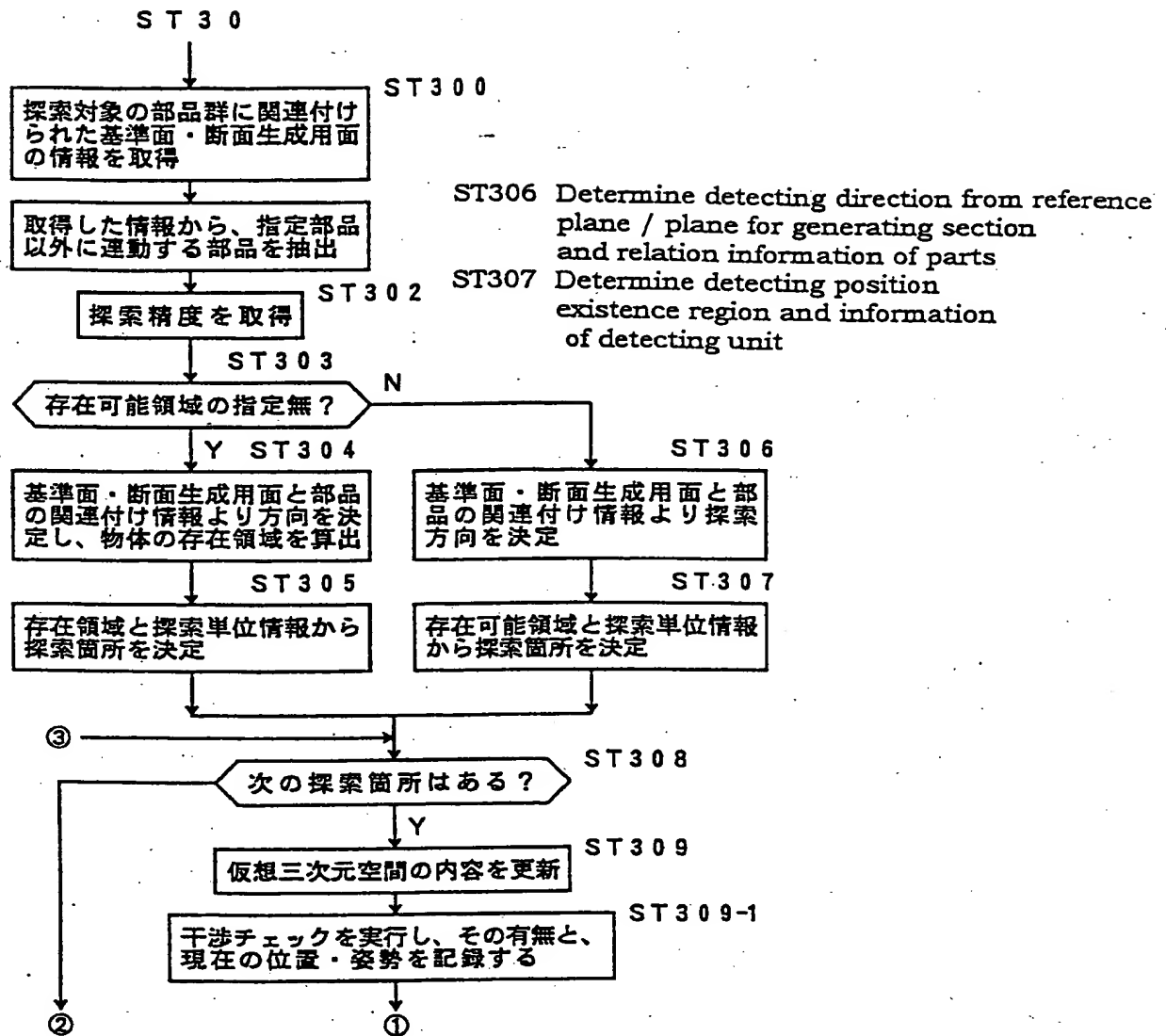
ST299 Add thickness ?

ST299-1 Direction of thickness

ST299-2 Generate form from region
and thicknessST299-3 Add region information to reference
plane / plane for generating cross section

Figure 57

本発明の実行する処理フロー



- ST300 Take information of reference plane / plane for generating cross section
- ST301 Extract linked parts directed other than directed parts from obtained information
- ST302 Take accuracy of detection
- ST303 Is there direction of allowable region of existence?
- ST304 Determine direction from reference plane / plane for generating cross section and relation information of parts, and calculate allowable region of existence
- ST305 Determine detecting position from existence region and information of detecting unit

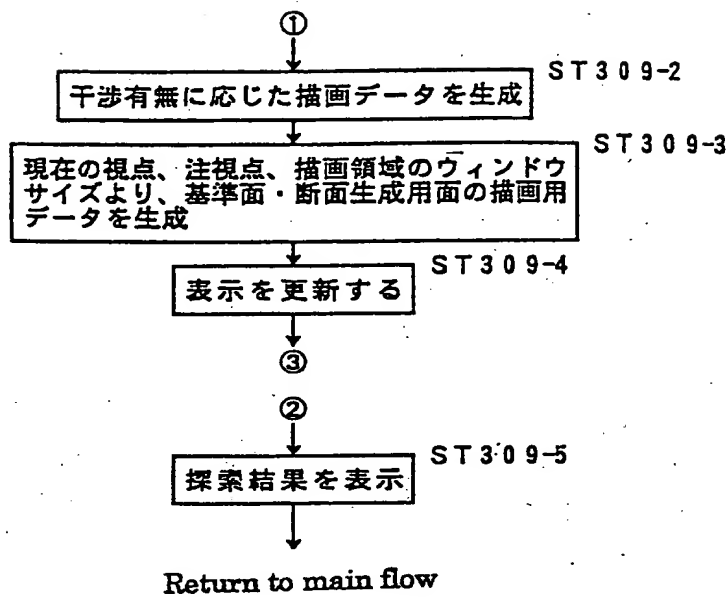
ST308 Is there next detecting position?

ST309 Update contents of three dimensional cross section.

ST309-1 Execute interference check, and register its existence or no-existence, present position / pose

Figure 58

本発明の実行する処理フロー



ST309-2 Generate image data corresponding to interference

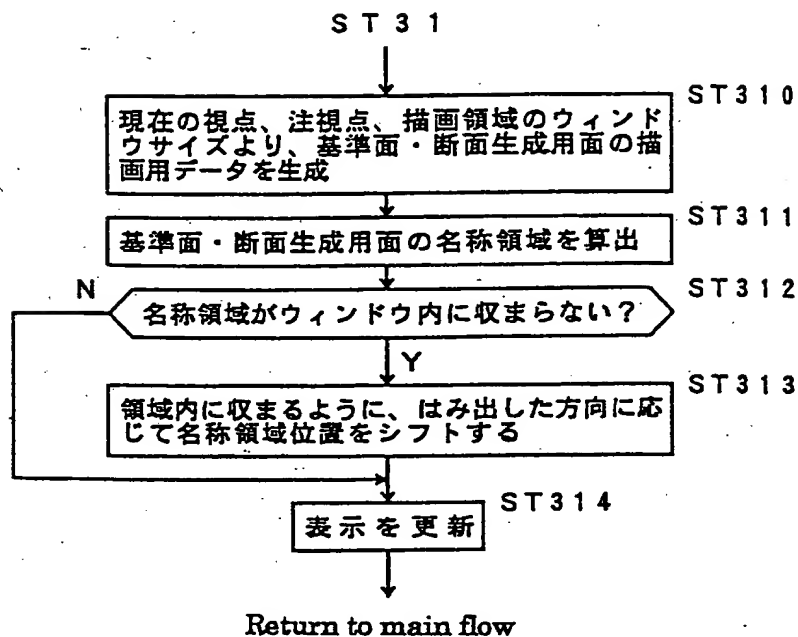
ST309-3 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region

S309-4 Update display

ST309-5 Display result of detection

Figure 59

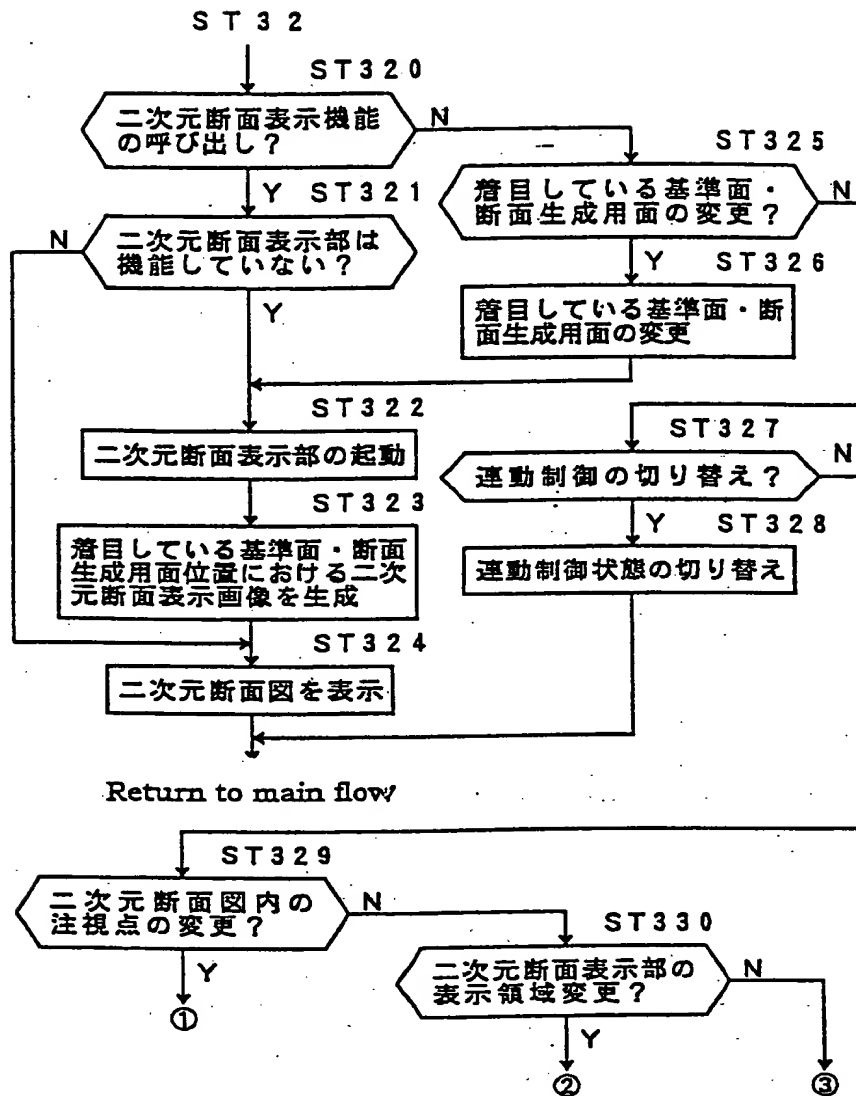
本発明の実行する処理フロー



- ST310 Generate image data of reference plane / plane for generating cross section by present viewpoint, observing point and window size of image region
- ST311 Calculate name region of reference plane / plane for detecting cross section
- ST312 Name region is within window ?
- ST313 Shift the position of the name region for direction determined by overflow direction so as to be positioned within the region
- ST314 Update display

Figure 60

本発明の実行する処理フロー



ST320 Calling display function of
two dimensional section ?

ST321 Display part of two dimensional
section is acting ?

ST322 Act display part of two dimensional cross section

ST323 Generate display image of two dimensional
section at the position of reference plane
/ plane for generating cross section aimed

ST 324 Display two dimensional cross section

ST325 Is there change of reference plane / plane
for generating cross section aimed ?

ST326 Change reference plane / plane for
generating cross section aimed

ST327 Is there change of link control ?

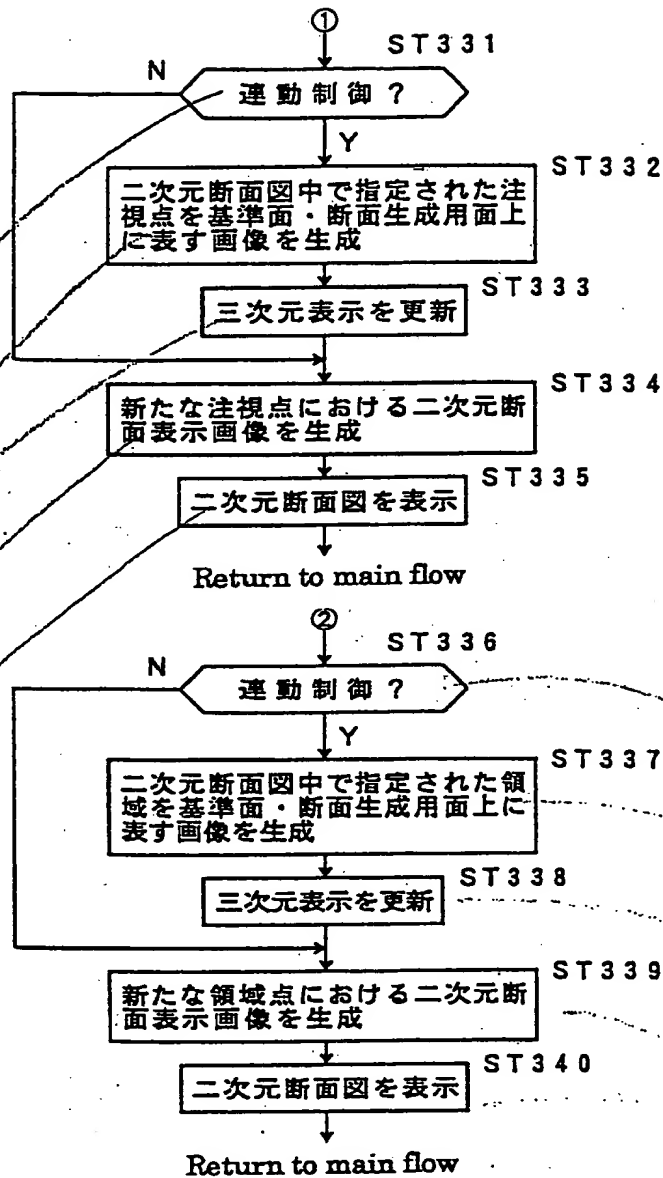
ST328 Change link control state

ST329 Is there change aimed point in figure of two dimensional cross point

ST330 Is there change of display region of two dimensional cross point

Figure 61

本発明の実行する処理フロー



ST331 Link control ?

ST332 Generate image of observing point directed on two dimensional cross section for displaying on reference plane / plane for generating cross section

ST333 Update three dimensional display

ST334 Generate image for displaying two dimensional cross section at new observed point

ST335 Display two dimensional cross section

ST336 Link control

ST337 Generate image of region directed on two dimensional cross section for displaying on reference plane / plane for generating cross section

ST338 Update three dimensional display

ST339 Generate image for displaying two dimensional cross section at new observed point

ST340 Display two dimensional cross section

Figure 62

本発明の実行する処理フロー

